

X6004

IP PBX

User's Guide

Version 1
9/2007
Edition 1



About This User's Guide

Intended Audience

This manual is intended for people who want to configure the X6004 using the web configurator. You should have at least a basic knowledge of TCP/IP networking concepts and topology.

Related Documentation

- Quick Start Guide
The Quick Start Guide is designed to help you get up and running right away. It contains information on setting up your hardware connections.
- Web Configurator Online Help
Embedded web help for descriptions of individual screens and supplementary information.
- Command Reference Guide
The Command Reference Guide explains how to use the Command-Line Interface (CLI) and CLI commands to configure the X6004.
- Supporting Disk
Refer to the included CD for support documents.
- ZyXEL Web Site
Please refer to www.zyxel.com for additional support documentation and product certifications.

User Guide Feedback

Help us help you. Send all documentation-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

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Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this User's Guide.



Warnings tell you about things that could harm you or your device.








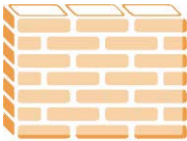



Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

Syntax Conventions

- The X6004 may be referred to as the “X6004”, the “device” or the “system” in this User's Guide.
- Product labels, screen names, field labels and field choices are all in **bold** font.
- A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the “enter” or “return” key on your keyboard.
- “Enter” means for you to type one or more characters and then press the [ENTER] key. “Select” or “choose” means for you to use one of the predefined choices.
- A right angle bracket (>) within a screen name denotes a mouse click. For example, **Maintenance > Log > Log Setting** means you first click **Maintenance** in the navigation panel, then the **Log** sub menu and finally the **Log Setting** tab to get to that screen.
- Units of measurement may denote the “metric” value or the “scientific” value. For example, “k” for kilo may denote “1000” or “1024”, “M” for mega may denote “1000000” or “1048576” and so on.
- “e.g.,” is a shorthand for “for instance”, and “i.e.,” means “that is” or “in other words”.

Icons Used in Figures

Figures in this User's Guide may use the following generic icons. The X6004 icon is not an exact representation of your device.

The X6004 	Computer 	Notebook computer 
Server 	DSLAM 	Firewall 
Telephone 	Switch 	Router 

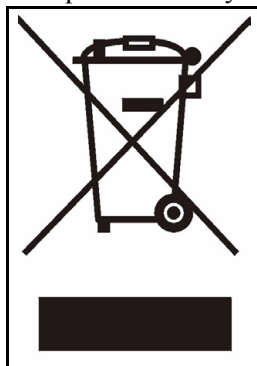
Safety Warnings



For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- ONLY qualified service personnel should service or disassemble this device.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Use ONLY an appropriate power adaptor or cord for your device. Connect it to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe).
- Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution.
- If the power adaptor or cord is damaged, remove it from the device and the power source.
- Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Use only No. 26 AWG (American Wire Gauge) or larger telecommunication line cord.
- Warning! To avoid risk of electric shock, remove only one card at a time and do not place fingers or objects inside the chassis. Cover empty slots with slot covers.

This product is recyclable. Dispose of it properly.



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PART I

Introduction and Tutorials

Getting to Know Your X6004 (33)

How It Works (37)

Tutorials (41)

Phone User Tutorial (65)

Getting to Know Your X6004

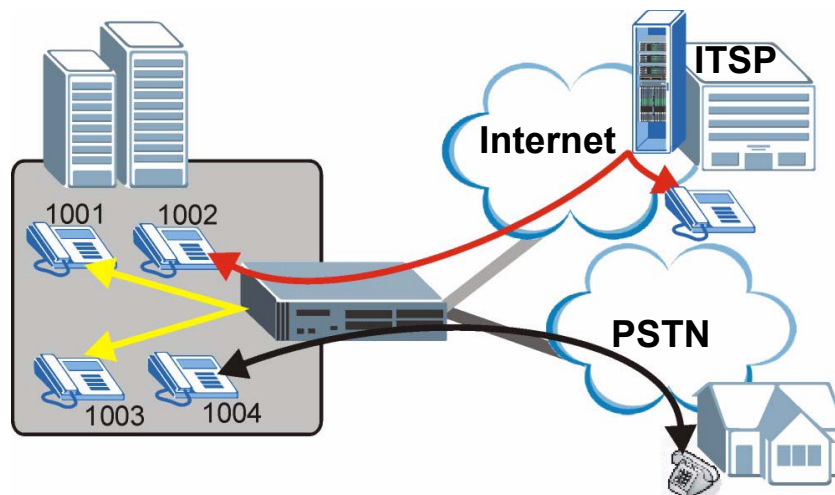
This chapter introduces the main features and applications of the X6004.

1.1 Introduction

An IP PBX is a telephone exchange device located at a company site which allows an organization to set up and control calls. IP stands for Internet Protocol, and PBX stands for Private Branch Exchange. A regular company telephone switchboard is an example of a PBX. The company's telephones are connected to the IP PBX. The IP PBX is then connected to the outside world via a connection to a traditional Public Switched Telephone Network (PSTN) or a broadband Internet connection to an Internet Telephony Service Provider (ITSP).

Each telephone connected to an IP PBX has an extension assigned to it. An extension is a unique telephone number within an organization typically consisting of only a few digits. People inside the company can call each other by dialing extensions. Calls to the outside world go through the IP PBX to the PSTN or ITSP.

Figure 1 IP PBX Example



The X6004 can function as a stand alone telephone switchboard for a small organization. It can also supplement a legacy PBX within an organization by providing VoIP telephony features.

1.1.1 Voice over Internet Protocol (VoIP) Implementation

The X6004 uses SIP (Session Initiation Protocol) to communicate with other SIP devices. SIP is an internationally-recognized standard for implementing Voice over Internet Protocol (VoIP).

The following figure shows SIP devices communicating with the X6004.

A: IP Phones - Telephones that convert voice into IP packets and vice versa (for example ZyXEL's V-500).

B: Softphones - Software-based phones installed on PCs.

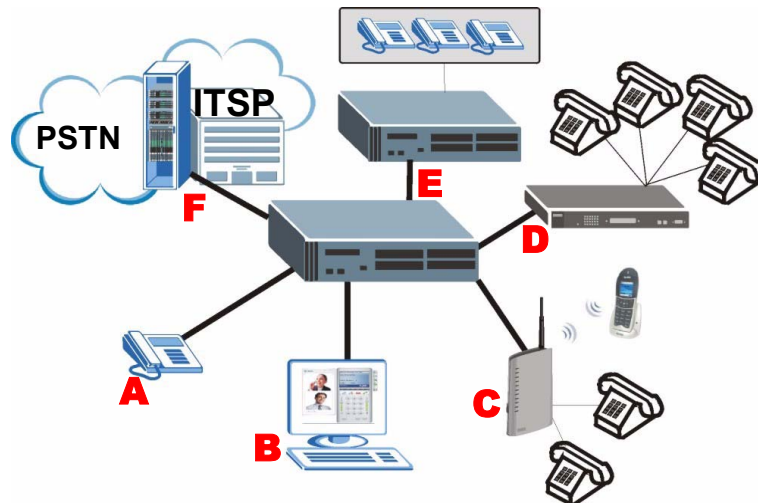
C: VoIP Gateways - Devices (for example ZyXEL's P-2302HWUDL) with built in SIP processing which allow traditional analog phones or cordless phones to use them as a link to the IP PBX.

D: ATAs - Analog Telephone Adapters (for example ZyXEL's P-2024) aggregate a large number of analog phones and convert their signal into IP packets.

E: Peer IP PBXs - Other SIP based IP PBXs with which you communicate over an IP network. This allows you to call the telephones connected to the peer IP PBX without going through a telephone service provider.

F: SIP Servers - Servers (**D**) located at your Internet Telephony Service Provider (ITSP) which process outgoing calls from the X6004 and direct them to IP phones on the Internet or traditional phones on the PSTN.

Figure 2 SIP Devices and the X6004



1.1.2 PBX Telephony Features

The X6004 allows you to set up and manage features on an internal telephone network without relying on your telephone service provider. The following are just a few examples:

- Conference calls
- Voicemail
- Call Forwarding

The X6004 integrates with your IP network. For example you can:

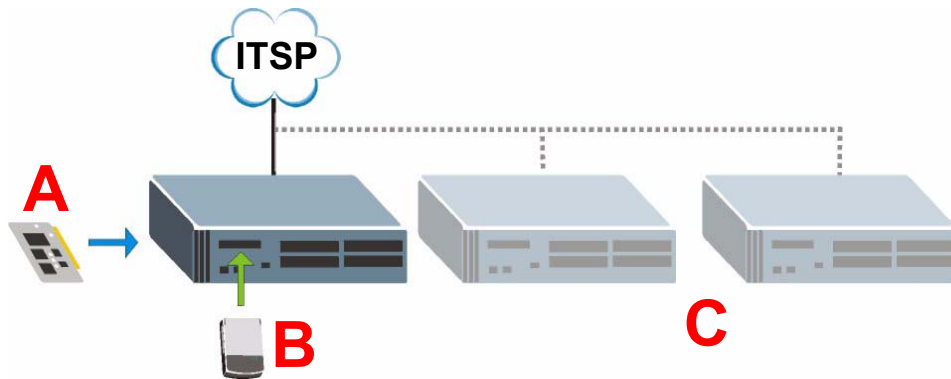
- Import an LDAP-based (Lightweight Directory Access Protocol) contact list to serve as the phonebook for the IP phones on your network.
- Set up the X6004 to send users email notifications or complete voice messages as attachments when they receive voicemail.

1.1.3 Scalable Design

The X6004 can be used stand alone to provide intercom (calling by extension) and VoIP features in a small business environment. The X6004's capability can be expanded by:

- **A** - Adding DSP (Digital Signal Processing) modules to handle more concurrent telephone connections. DSP modules are chips which convert analog information into digital data and vice versa.
- **B** - Adding a hard disk to store a greater volume of voice messages and call records.
- **C** - Connecting several X6004s together to manage a larger telephone network.

Figure 3 Scalable Design



1.2 Ways to Manage the X6004

Use any of the following methods to manage the X6004.

- **Web Configurator.** This is recommended for everyday management of the X6004 using a (supported) web browser. You can also use the web configurator for firmware upgrades and configuration backup/restore.
- **Command Line Interface.** Line commands offer an alternative to the web configurator and in some cases are necessary to configure advanced features.
- **FTP.** Use FTP for firmware upgrades.

1.3 Good Habits for Managing the X6004

Do the following things regularly to make the X6004 more secure and to manage the X6004 more effectively.

- **Change the administrator password.** Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters.

- Write down the administrator password and put it in a safe place.
- Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the X6004 to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the X6004. You could simply restore your last configuration.

1.4 LEDs

The figure below shows the LEDs on the X6004.

Figure 4 LEDs



The following table describes the LEDs.

Table 1 LEDs

LED	COLOR	STATUS	DESCRIPTION
PWR	Green	On	The X6004 is turned on.
		Off	The X6004 is off.
SYS	Green	Blinking	The X6004 is rebooting and performing self-diagnostic tests.
		On	The X6004 is on and functioning properly.
		Off	The power is off or the X6004 is not ready/malfunctioning.
ALM	Red	On	There is a hardware failure.
		Off	The X6004 is functioning normally.
HDD	Green	Blinking	The X6004 is writing to the hard disk.
		On	The hard drive is installed and recognized by the X6004.
		Off	The X6004 does not have a hard drive installed.
Interface Card LEDs			
SYS	Green	On	The interface card is functioning properly.
		Off	The interface card is not recognized by the X6004.
FXS 1~4	Green	On	The line is in use.
		Off	The line is not in use.
FX0 1~4	Green	On	The line is connected and receiving a signal.
		Off	The line is not connected.

How It Works

This chapter is an overview of different logical components and how they work together to route calls on the X6004.

2.1 Call Routing

The two main functions of any IP-PBX are routing internal calls and handling calls to and from the outside world.

The following sections explain how these functions are performed on the X6004.

2.1.1 Call Routing Terms

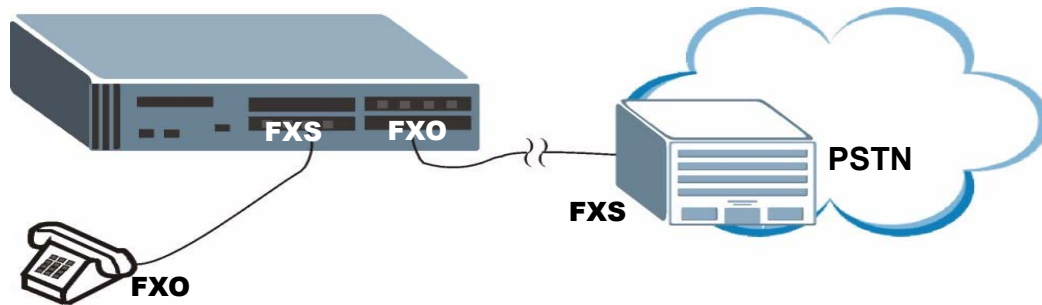
The following are some terms related to ZyXEL's IP-PBX implementation.

- **Extension** - This is a unique number assigned to each telephone connected to the X6004. Extensions are used to make calls between phones connected to the X6004 and to route calls from the outside world to their correct target. Extensions fall into the following two groups:
 - **SIP Extension** - This is an extension assigned to a SIP (Session Initiation Protocol) based IP phone connected to the X6004. Alternatively this could be an extension assigned to an analog phone which connects to the X6004 via a VoIP gateway device.
 - **FXS (Foreign Exchange Subscriber) Extension** - This is an extension assigned to an analog phone directly connected to a port on an FXS interface card installed on the X6004 (See [Figure 5 on page 38.](#)) The FXS ports on the X6004 work the same way as the phone sockets in your home. In your home you are a subscriber to the telephone services of your local telephone company and when you connect an analog phone to the X6004 you subscribe to the telephone services of the X6004.
- **Authority Group** - This is a set of extensions. Each extension can only belong to one authority group. Authority groups manage extensions by allowing them to make only certain types of calls. For example, if you create two authority groups, you can allow one group to make local calls and long distance calls and the second authority group to make local calls only.
- **Outbound Line Group** - This is a set of connections or lines going to the outside world.
 - **SIP Trunk** - This is a connection to your ITSP (Internet Telephony Service Provider).
 - **Trusted Peer** - This is a connection to another IP PBX or SIP server. The trusted peer device must also specify your X6004 as a trusted peer.

- **FXO (Foreign Exchange Office) Trunk** - This type of outbound line group consists of telephone cables connected to ports on an FXO interface card on the X6004. The telephone cables lead to the PSTN (Public Switched Telephone Network), or in other words your traditional (non-VoIP) telephone company. FXO ports always point in the direction of the telephone services.

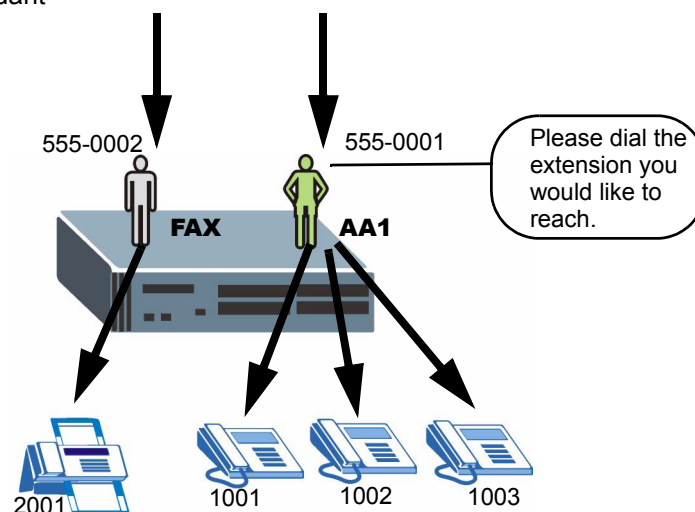
The figure below shows the relationship between FXS and FXO ports.

Figure 5 FXS and FXO Ports



- **LCR (Least Cost Routing)** - This is a rule which specifies which outbound line group is used when making an outbound call. It consists of a dialing condition, for example dial **0** to make a call via a specific FXO trunk or dial **1** for calls via a SIP trunk. LCRs also set priority to which outbound line group should be tried first, second, third and so on when making outbound calls with the same dialing condition.
- **Auto-Attendant** - This is a feature which routes incoming calls to their proper extension. An auto-attendant is assigned to each outbound line group and it services incoming calls on those lines. If your organization has two outbound line groups, each with a specific telephone number for incoming calls, then you can assign a different auto-attendant for each incoming line. Assign one auto-attendant for general calls to the extensions in your organization (for example **AA1**) and one auto-attendant for direct routing to a FAX machine (for example **FAX**).

Figure 6 Auto-Attendant



2.2 Internal Call Routing

Internal call routing refers to calls between extensions on the X6004. People simply dial the extension they want to call. The X6004 checks to see if the number dialed is an existing extension and forwards the call to that extension. The X6004 by default allows people with extensions from one authority group to call extensions in another authority group. You can, however, block calls between authority groups if your organization requires such a setting.

The configuration requirement for setting up internal call routing are:

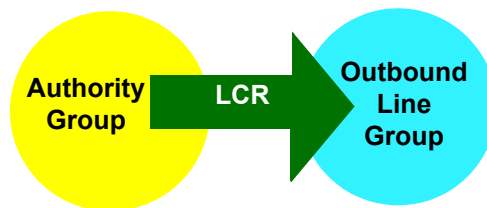
- 1 Create an authority group.
- 2 Create extensions in the authority group.

2.3 Outbound Call Routing

Outbound call routing refers to calls originating from an extension on the X6004, going via an outbound line group to a telephone outside your organization. Outbound call routing requires that an authority group is linked to an outbound line group. The link between the two is an LCR (Least Cost Routing). LCRs contain the dialing rules for outbound line groups. Authority groups need to be associated to LCRs to gain access to the outbound line groups.

In the most basic setup example an organization has one authority group (with all of the company's extensions), one outbound line group and an LCR which grants the authority group access to outbound lines. Everyone in the organization has the same rights to use outbound lines.

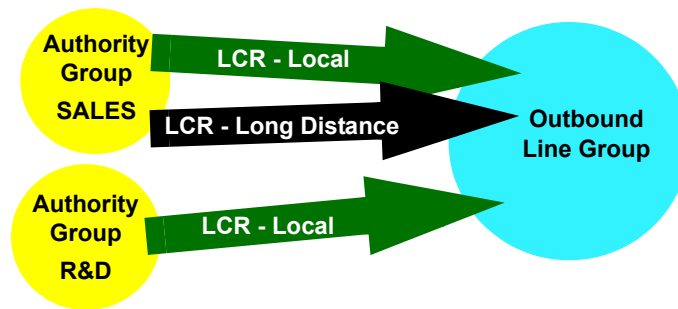
Figure 7 Outbound Call Routing - Basic



In a more advanced example, you can create two authority groups, still have one outbound line group and two different LCRs. You can now control the types of outbound calls that can be made by each authority group.

In the figure below, the **SALES** authority group has a local call LCR and a long distance LCR associated to it. This allows its group members to make both local and long distance calls via the outbound line group. R&D authority group only has the local LCR associated to it so its group members can only make local calls via the outbound line group.

Figure 8 Outbound Call Routing - Advanced



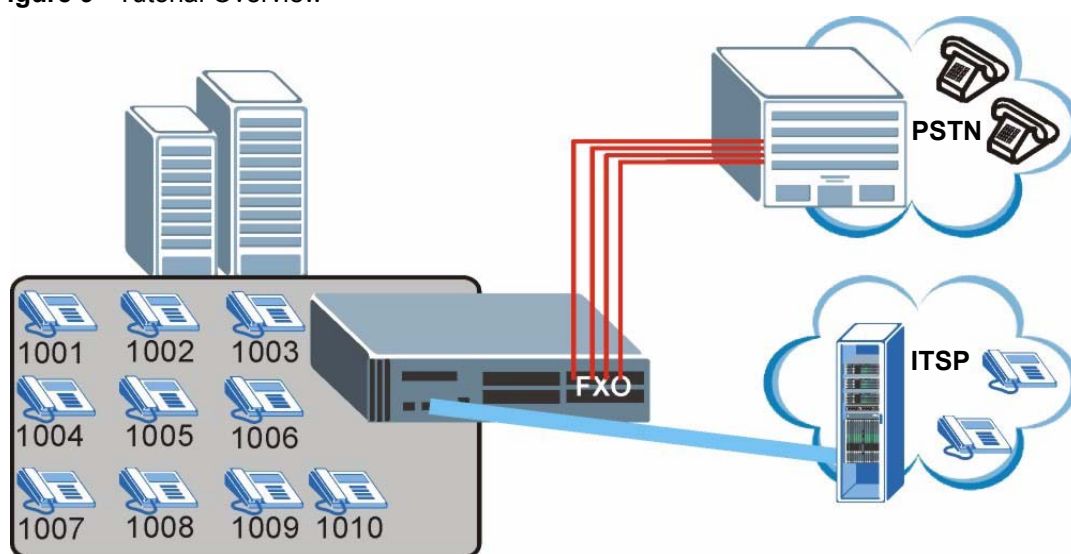
The configuration requirement for setting up outbound call routing are:

- 1** Create an authority group.
- 2** Create extensions in the authority group.
- 3** Create an outbound line group.
- 4** Create LCRs and add outbound line groups to them.
- 5** Associate LCRs to authority groups.

Tutorials

This chapter provides some examples of using the web configurator to set up and use the X6004. Specifically, the tutorials will show you how to set up the X6004 for a telephone network as shown in the following figure.

Figure 9 Tutorial Overview



The tutorials include:

Table 2 Tutorials Overview

TUTORIAL GOAL	STEPS
Making Internal Calls	<ul style="list-style-type: none"> • Configure SIP Extensions • Connect IP Phones • Register IP Phones • Auto Provisioning
Making PSTN Calls	<ul style="list-style-type: none"> • Connecting to PSTN • Dialing Rule for PSTN • LCR to Authority Group Assignment
Making ITSP Calls	<ul style="list-style-type: none"> • Connecting to ITSP • Dialing Rule for ITSP • LCR to Authority Group Assignment
Using Call Features	<ul style="list-style-type: none"> • Customizing Feature Codes • Using the Voicemail Feature

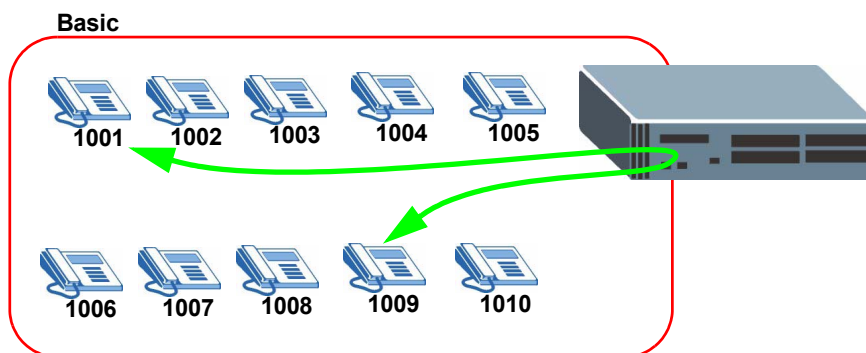


This chapter assumes that you have already configured your network settings. See the Network Wizard section in the QSG or [Chapter 6 on page 85](#) for more information.

3.1 Making Internal Calls

This tutorial sets up the internal telephone extensions on your network. At the end of this tutorial you should be able to call between extensions. The next figure shows the telephone extensions (**1001 - 1010**) configured in this tutorial. All of the extensions are members of an authority group called **Basic** (you need to create an authority group before configuring extensions, see [Chapter 2 on page 37](#) for more information). The figure also shows an internal call between extensions **1001** and **1009**.

Figure 10 Internal Calls



3.1.1 Configure SIP Extensions

The following section introduces how to create the authority group called **Basic** and ten SIP extensions **1001** to **1010** on the X6004. The number of extensions you can create is limited by your service subscription (see [Section 31.1.1 on page 259](#)).

Procedure:

- 1 In the web configurator, click **Configuration > PBX > Extension Management > Authority Group** to open the following screen.

Figure 11 Configuration > PBX > Extension Management > Authority Group

The screenshot shows the 'Authority Group' configuration page in a web configurator. At the top, there's a tab labeled 'Authority Group'. Below it, the title 'Authority Group' is displayed. There is a form with an 'Extension Number' input field and a 'Query' button. To the right of the form are three buttons: 'Add', 'Advanced', and 'Delete'. A red arrow points to the 'Add' button. Below the buttons is a table with three columns: 'Machine ID', 'Group Name', and 'Description'. The 'Add' button is circled in red.

- Click the **Add** icon to open the following screen. Enter the name of the group (**Basic** in this example) and click **Add**. The **Machine ID** field is a name automatically assigned to the X6004.

Figure 12 Add/Edit Authority Group

- The new authority group displays in the following screen. Now you will add SIP extensions to the authority group. Click the new authority group's **Advanced** icon.

Figure 13 Configuration > PBX > Extension Management > Authority Group

- The following screen displays. Click **Add SIP Peers** to configure multiple SIP accounts at the same time.

Figure 14 Authority Group Configuration

- Configure the screen as shown next. The SIP extension number and any configured **SIP Auth. Password** prefix and/or postfix make up the SIP password. The SIP password must be at least four digits. This example uses ten four-digit SIP extensions **1001 - 1010** that are also used as the SIP usernames. The SIP passwords are comprised of the combination of **Prefix + Extension + Postfix**. In this example, the **SIP Auth. Password**

Prefix value is **11** and the **Postfix** value is **99**. The SIP username for extension **1001** is **1001** and the SIP password for this extension is **11100199**. You do not need to configure the **Prefix** and **Postfix** values as long as the SIP password length is at least four digits long. Click **Apply** and wait for the X6004 to create the ten extensions.

Figure 15 Add Multiple SIP Extensions

6 The SIP extensions display as shown here.

Figure 16 Authority Group Configuration

	User Name	Type	Extension Number	Description
<input type="checkbox"/>	1001	SIP	1001	
<input type="checkbox"/>	1002	SIP	1002	
<input type="checkbox"/>	1003	SIP	1003	
<input type="checkbox"/>	1004	SIP	1004	
<input type="checkbox"/>	1005	SIP	1005	
<input type="checkbox"/>	1006	SIP	1006	
<input type="checkbox"/>	1007	SIP	1007	
<input type="checkbox"/>	1008	SIP	1008	
<input type="checkbox"/>	1009	SIP	1009	
<input type="checkbox"/>	1010	SIP	1010	

7 Keep a list of the SIP passwords (the **Prefix** + **Extension Number** + **Postfix** combinations in this example). When you deploy the network's IP phones, you will need this information for SIP registration. See [Section 3.1.2 on page 45](#) for information on configuring your IP phones.

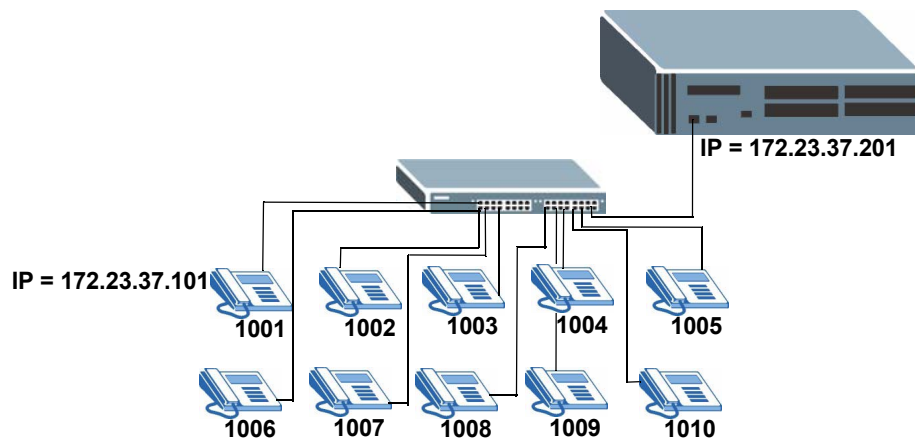
The extension number serves as the password the user uses to log into the X6004 to configure his extension's call forwarding, call blocking, phonebook, voice mail, and other settings. See [Chapter 32 on page 265](#) for more information.

- 8 If the IP phone is from ZyXEL and supports auto provisioning, use section [Section 3.1.4 on page 46](#) to map the SIP extensions to your network's SIP devices.

3.1.2 Connect IP Phones

You can now set up your IP phones. The next figure shows the network connections of the IP phones and the X6004. In this example, all of the IP phones and the X6004 are connected to an Ethernet switch and are all assigned IP addresses in the same subnet.

Figure 17 Connect IP Phones



3.1.3 Register IP Phones

After your network connections have been made, you can proceed with the SIP registration of the IP phones on your network. The next figure shows a typical SIP registration screen of a ZyXEL IP phone. This is a sample screen only, but it includes all the key fields necessary to complete a SIP registration. It shows the SIP registration of an IP phone with the extension **1001**.

Figure 18 Example IP Phone SIP Registration Screen

SIP Settings

SIP Account: SIP 1

☒ Active

Number: 1001

SIP Local Port: 5060 (1024-65535)

SIP Server Address: 172.23.37.201

SIP Server Port: 5060 (1024-65535)

REGISTER Server Address: 172.23.37.201

REGISTER Server Port: 5060 (1024-65535)

SIP Service Domains: 172.23.37.201

☒ Send Caller ID

Voice Mail Number: **1001

☐ DNS SRV

Authentication

User Name: 1001

Password: *****

Apply Advance Setup

EXAMPLE

Extension Number of IP Phone

IP Address of the X6004

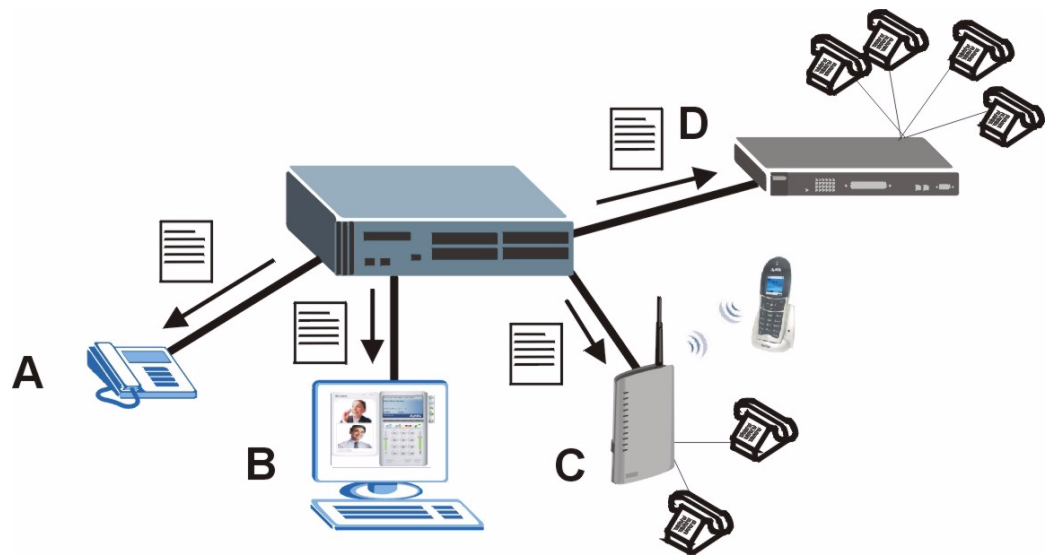
SIP Password (Prefix + Extension + Postfix)

Complete the SIP registration for all the IP phones on your network. When all the phones are registered, you can make internal calls by dialing the extension number assigned to each phone.

3.1.4 Auto Provisioning

A ZyXEL IP phone that supports auto provisioning can get a configuration text file from the X6004 (see [Appendix on page 283](#) for supported IP phones). The configuration file contains the SIP settings that the SIP device uses to register with the X6004. The following graphic shows an IP phone (A), softphone (B), VoIP gateway (C), and ATA (D) downloading configuration text files from the X6004.


Figure 19 Auto Provisioning



After you configure the SIP extensions (see [Section 3.1.1 on page 42](#)) and make your network connections (see [Figure 17 on page 45](#)), use the following directions to map each SIP extension to the appropriate SIP device. You need the MAC address of each SIP device (or the serial number if it is a softphone).

- 1 Click **Configuration > PBX > Server Configuration > Auto Provision**. Then click a SIP extension’s **Edit** icon.

Figure 20 Configuration > PBX > Server Configuration > Auto Provision

Auto Provision					
Configuration					
Phone Numbers	MAC Address	Serial No.	SIP File Exist	Edit	View SPTGEN
1001			No		
1002			No		
1003			No		
1004			No		
1005			No		
1006			No		
1007			No		
1008			No		
1009			No		
1010			No		

- 2 Enter the SIP device’s MAC address (or serial number if it is a ZyXEL softphone). This example is for a softphone with a serial number of 1234567890. Click **Set Profile**.

Figure 21 Configuration > PBX > Server Configuration > Auto Provision > Edit

Auto Provision Setting

Provisioning Setting

MAC Address:

Serial No.:

Auto Provision Active:

Auto Provision Interval Time: (seconds) <1~26000000>

Auto Provision Delay Time: (seconds)

ATA device: ☐

Port No.:

- 3** The serial number of the softphone that is to use the SIP extension displays in the summary screen.

Figure 22 Configuration > PBX > Server Configuration > Auto Provision

Auto Provision

Configuration

:Edit

Phone Numbers	MAC Address	Serial No.	SPTGEN File Exist	Edit	View SPTGEN
1001		1234567890	No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1002			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1003			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1004			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1005			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1006			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1007			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1008			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1009			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>
1010			No	<input type="button" value="Edit"/>	<input type="button" value="View"/>

- 4** Repeat these steps to map each SIP extension to a SIP device's MAC address or serial number.

3.1.4.1 Configuring the IP Phones for Auto Provisioning

Configure the ZyXEL IP phones to receive configuration information from the X6004. This typically involves enabling auto provisioning and specifying the protocol to use (HTTP at the time of writing). See the documentation that came with your ZyXEL IP phone for information on how to do this.

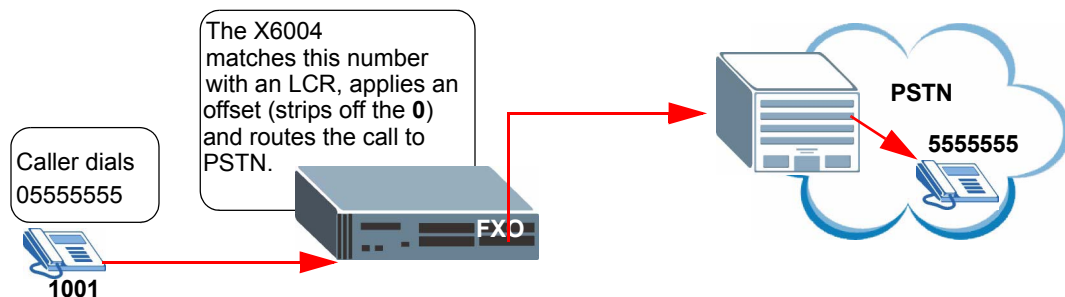
Once the IP phones receive their configuration information via auto provisioning, they will automatically register with the X6004. You can make internal calls by dialing the extension number assigned to each phone.

3.2 Making PSTN Calls

The following section shows you how to make and receive calls via a connection to the PSTN. This example covers:

- **Connecting to PSTN** - configuring the outbound line group (connection settings) from the FXO interface card to the PSTN.
- **Dialing Rule for PSTN** - creating a rule which tells the X6004 when to use the PSTN connection when completing outbound calls.
- **LCR to Authority Group Assignment** - giving extensions the right to make outbound calls via the PSTN connection.

Figure 23 Making a PSTN Call



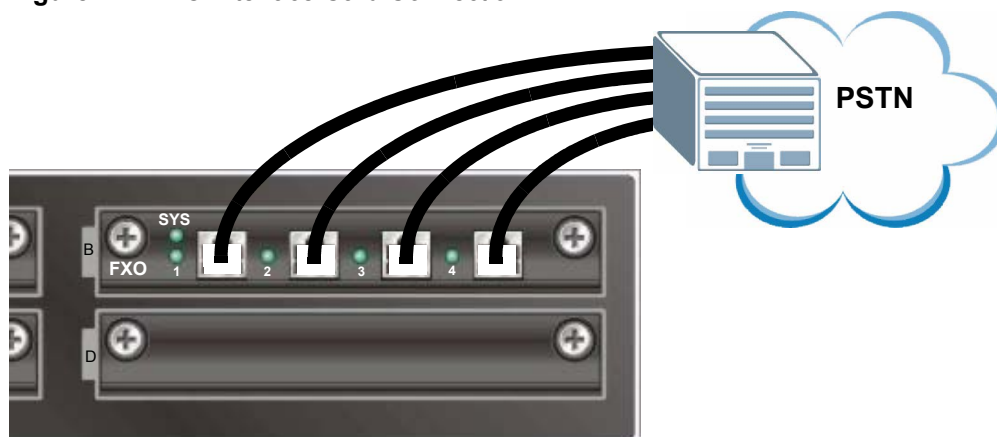
3.2.1 Connecting to PSTN

This example assumes that the X6004 has an FXO interface card already installed (refer to the Quick Start Guide) and that you have connected your telephone cables to the outlets that connect to your local telephone company. The front of your X6004 should look as shown in the following figure.



Note that the FXO interface card is installed in slot **B** and ports **1-4** are used for the connections. You will use this information in a web configurator screen.

Figure 24 FXO Interface Card Connection



Procedure:

- 1 In the web configurator, click **Configuration > PBX > Outbound Line Management > Outbound Line Group** to open the following screen.

Figure 25 Configuration > PBX > Outbound Line Management > Outbound Line Group

- 2 Click the **Add** icon in the **FXO Trunk** section to open the following screen. Enter the name of the group (**PSTN1** in this example) and click **Apply**. Note the **Machine ID** field (this is a name automatically assigned to the X6004). In some web configurator screens, the outbound line group is identified in the following format **Machine ID:Group Name**, so in our example it is **IPPBX_01:PSTN1**.

Figure 26 Add FXO Trunk

- 3 The new outbound line group displays in the following screen. Now you will add the FXO connections to the outbound line group. Click the outbound line group's **Advanced** icon.

Figure 27 Configuration > PBX > Outbound Line Management > Outbound Line Group

- 4 The following screen displays. Select the FXO interfaces that you want to add to this outbound line group and click the **Right** icon to move them to the **Used Interface** column. Click **Apply** when you are done.

Figure 28 FXO Connection Configuration

- 5 The **Outbound Line Group** screen displays again. Click the **Auto-Attendant** icon. **Auto-Attendant** routes incoming calls (see [Chapter 19 on page 175](#) for details).

Figure 29 Configuration > PBX > Outbound Line Management > Outbound Line Group

- 6 Make sure the **Default AA** option is selected (**FAX** is used to forward calls to a single extension, such as your FAX machine's extension) and click **Apply**.

Figure 30 Confirm AA Setting

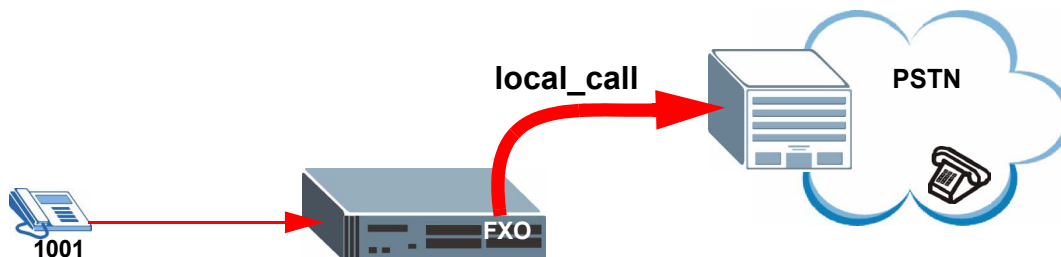
- 7 People from the outside world can now call the X6004 using the PSTN numbers provided by your local telephone company. The **Default AA** prompts the callers to dial the extension they would like to reach. See [Section 3.2.2 on page 52](#) for information on how to set up a dialing rule so that the extensions on your network can connect to the PSTN.

3.2.2 Dialing Rule for PSTN

The following sections show you how to create outbound dialing rules (also referred to as Least Cost Routing or LCR).

The LCRs determine which outside line the X6004 should use to complete outbound calls. In our example we want to use the **PSTN1** outbound line group to complete local calls.

Figure 31 Outbound Calls via PSTN



Procedure:

- 1 In the web configurator, click **Configuration > PBX > Outbound Line Management > LCR** to open the following screen.

Figure 32 Configuration > PBX > Outbound Line Management > LCR

LCR List			
Delete			
<div> ✚ Add ✎ Edit ✖ Delete </div>			
<input type="checkbox"/>	LCR Name	Comment	
<input type="checkbox"/>	ezout	easy to call out	✎ ✖
<input type="checkbox"/>	local_call	local call LCR	✎ ✖
<input type="checkbox"/>	long_distance_call	long distance call LCR	✎ ✖
<input type="checkbox"/>	international_call	international call LCR	✎ ✖
Delete			

- 2 Click the **Edit** icon in the **local_call** section to open the following screen. Select the outbound line group from the pool column that you want to add to this LCR (in our example this is **IPPBX_001:PSTN1** as configured in [Section 3.2.1 on page 49](#)), then click the **Right** icon to move them to the **Selected** column. Click **Apply** to save the outbound line group in the LCR and then click the **Add** icon to configure a dial condition.

Figure 33 local_call LCR

3 The **Dial Condition** screen appears as shown.

- Type **0** followed by a period (.) in the **Dial Condition** field. This means that this LCR will be used when callers dial any number that begins with a **0**. The period (.) is a wildcard character, meaning anything can follow the zero.
- Test the dial condition. In our example, we tested the number **05555555** to see if it matches our dial condition. You can test any number by typing it in the **Number Pattern Test** field and clicking the **Right** icon; an **O** appears, if the number typed in matches the dial condition and an **X** appears if it does not match the dial condition.
- Specify an offset value. In our example, we configure an offset value of **1**. The offset value tells the X6004 how many initial digits (if any) it should strip off of the dialed number before routing the call to the external line. See [Figure 37 on page 55](#) for an example.
- Click **Apply** to save your settings.

Figure 34 Dial Condition for local_call LCR

4 You are done configuring the LCR. However, before it can be used by any of the phones connected to the X6004, the LCR needs to be assigned to an appropriate authority group.

3.2.3 LCR to Authority Group Assignment

The **Group Management** screen allows you to give an authority group (and the extensions in that group) the right to use an LCR (outbound dial condition). In our example, we give the authority group **Basic** the right to call out using the LCR **local_call**.

Procedure:

- 1 Click **Configuration > PBX > Group Management** to view the following screen.

Figure 35 Configuration > PBX > Group Management

The screenshot shows the 'Group Management' screen with a tab labeled 'Group Management'. Below the tab are four sections: 'Authority Group', 'FXO Trunk', 'SIP Trunk', and 'Trusted Peer'. Each section contains a table with columns: 'Machine ID', 'Group Name', 'Description', and 'Advanced Setting'. In the 'Authority Group' section, there is one row with 'Machine ID' IPPBX_001, 'Group Name' Basic, and 'Description' empty. The 'Advanced Setting' column for this row has an icon (a small document with a pencil) circled in red, with a red arrow pointing to it from the top right.

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	Basic		

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	PSTN1		

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	ITSP1		

Machine ID	Group Name	Description	Advanced Setting
------------	------------	-------------	------------------

- 2 Click the **Advanced** icon in the **Authority Group** section (in this example there is only one authority group - **Basic**) of the screen to view the screen as shown. Select the checkbox in the **Advanced** column of the **local_call** LCR as shown below. Click **Apply**.

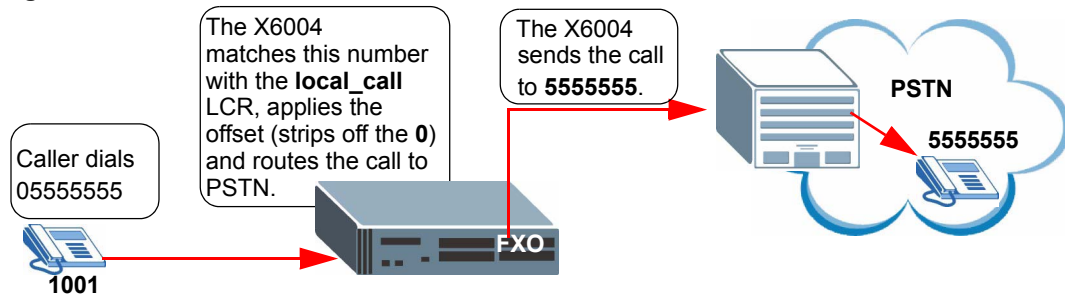
Figure 36 LCR to Authority Group Assignment

The screenshot shows the 'Group Management' screen with a tab labeled 'Group Management'. Below the tab is a section titled 'Accessible Group List'. Under this section, 'Group Name' is set to 'Basic'. Below this is a table with columns: 'Group Name', 'Description', 'Group Type', and 'Advanced Setting'. There are four rows in the table. The 'local_call' row has a checkbox checked in the 'Advanced Setting' column, which is circled in red with a red arrow pointing to it from the top right. At the bottom of the screen are 'Apply' and 'Cancel' buttons.

Group Name	Description	Group Type	Advanced Setting
ezout	easy to call out	LCR	<input type="checkbox"/>
local_call	local call LCR	LCR	<input checked="" type="checkbox"/>
long_distance_call	long distance call LCR	LCR	<input type="checkbox"/>
international_call	international call LCR	LCR	<input type="checkbox"/>

Apply Cancel

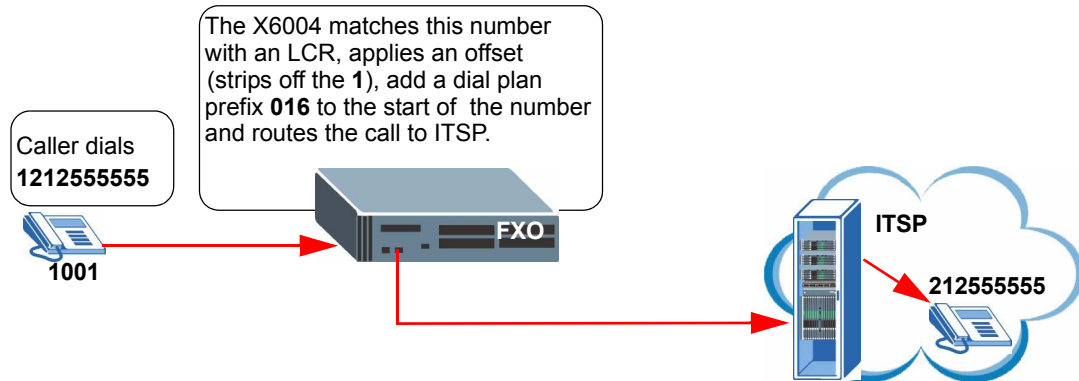
- 3 You can now use the telephones that are part of the **Basic** authority group to make outbound calls using the PSTN connection. The following figure summarizes the outbound call process for this example.

Figure 37 Outbound Calls via PSTN

3.3 Making ITSP Calls

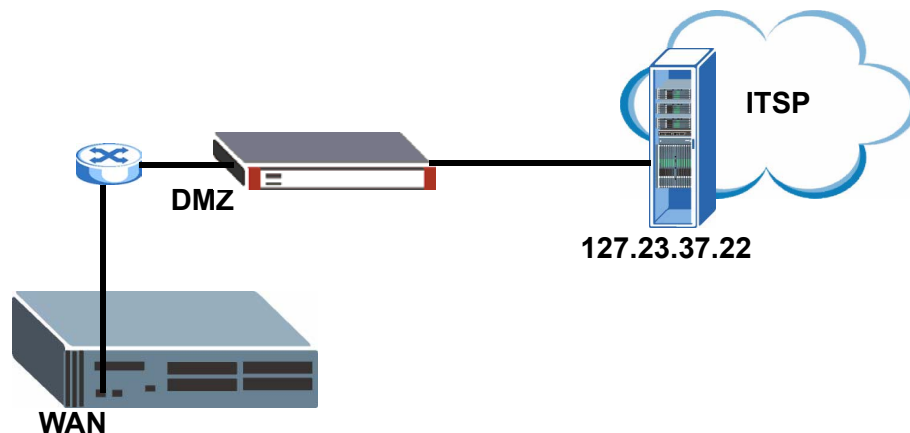
The following section shows you how to make and receive calls via a connection to the PSTN. This example covers:

- **Connecting to ITSP** - configuring the outbound line group (connection settings) from the X6004 to the ITSP.
- **Dialing Rule for ITSP** - creating a rule which tells the X6004 when to use the ITSP connection when completing outbound calls.
- **LCR to Authority Group Assignment** - giving extensions the right to make outbound calls via the ITSP connection.

Figure 38 Making ITSP Calls

3.3.1 Connecting to ITSP

The following section introduces how to configure a connection to the ITSP. This example assumes that the X6004 has a network connection to the SIP server at your ITSP. The following figure shows the network configuration used in this example.

Figure 39 Network Connection to ITSP

The following table describes our sample account information as provided by the ITSP:

Table 3 Sample VoIP Account Information

INFO	VALUES	INFO	VALUES
SIP Number	5551122	SIP Service Domain	127.23.37.22
SIP Server Address	127.23.37.22	DTMF Mode	SIP-INFO
SIP Server Port	5060	SIP Username	5551122
Register Server Address	127.23.37.22	SIP Password	1234
Register Server Port	5060	Codecs supported	G.726, G.729A

Procedure:

- 1 In the web configurator, click **Configuration > PBX > Outbound Line Management > Outbound Line Group** to open the following screen.

Figure 40 Configuration > PBX > Outbound Line Management > Outbound Line Group

The screenshot shows the 'Outbound Line Group' configuration page. It has a header 'Outbound Line Group' and three main sections: 'FXO Trunk', 'SIP Trunk', and 'Trusted Peer'. Each section contains a table with columns 'Machine ID', 'Group Name', and 'Description'. Above the 'SIP Trunk' table, there are icons for 'Add', 'Advanced', 'Edit', 'Delete', and 'Auto-Attendant'. A red circle highlights the 'Add' icon in the 'SIP Trunk' section, with a red arrow pointing to it.

- 2 Click the **Add** icon in the **SIP Trunk** section to open the following screen. Enter the name of the group ("ITSP1" in this example) and click **Apply**. Note the **Machine ID** field (this is a name automatically assigned to the X6004), in some management screens the outbound line group is identified in the following format **Machine ID:Group Name**, so in our example it is **IPPBX_01:ITSP1**.

Figure 41 Add SIP Trunk

Outbound Line Group

SIP Trunk

Machine ID

IPPBX_001

Group Name

ITSP1

Description

Apply

Back to Outbound Group

- 3 The new outbound line group displays in the following screen. Now you will configure the connection to your ITSP. Click the outbound line group’s **Advanced** icon.

Figure 42 Configuration > PBX > Outbound Line Management > Outbound Line Group

Outbound Line Group

FXO Trunk

AddAdvancedEditDeleteAuto-Attendant

Machine ID	Group Name	Description	
IPPBX_001	PSTN1		<div></div>

SIP Trunk

Machine ID	Group Name	Description	
IPPBX_001	ITSP1		<div><div></div></div>

Trusted Peer

Machine ID	Group Name	Description	
------------	------------	-------------	--

- 4 The following screen displays. Fill in the fields with the information provided by your ITSP (in our example we use the sample information as shown in [Table 3 on page 56](#)). Click **Apply** when you are done.

Figure 43 SIP Connection Configuration

Outbound Line Group

SIP Setting

Number: 5551122

SIP Local Port: 5060

SIP Server Address: 127.23.37.22

SIP Server Port: 5060

REGISTER Server Address: 127.23.37.22

REGISTER Server Port: 5060

SIP Service Domain: 127.23.37.22

DTMF Mode: info

Caller ID: ☒ On ☐ Extension Number

Authentication

User Name: 5551122

Password: ****

CODEC Setting

CODEC Pool

CODEC List

- G.711 a-law
- G.726
- G.723.1
- H.261
- H.263

Apply Cancel

- 5 The **Outbound Line Group** screen displays again. Click the **Auto-Attendant** icon in the **SIP Trunk** section of the screen.

Figure 44 Configuration > PBX > Outbound Line Management > Outbound Line Group

Outbound Line Group

FX0 Trunk

Machine ID: IPPBX_001, Group Name: PSTN1, Description: PSTN1

SIP Trunk

Machine ID: IPPBX_001, Group Name: ITSP1, Description: ITSP1

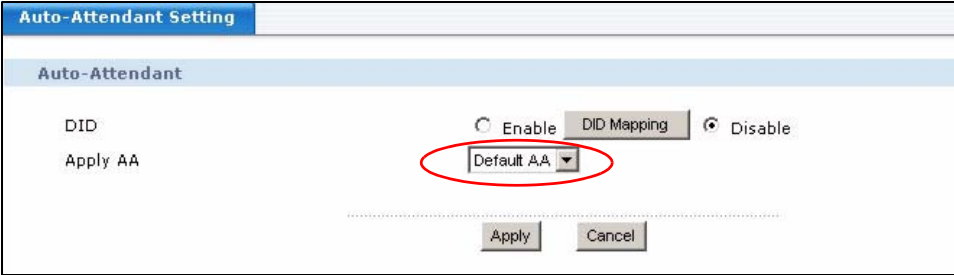
Trusted Peer

Machine ID: , Group Name: , Description:

Red arrow points to the Auto-Attendant icon in the SIP Trunk section.

- 6 Make sure the **Default AA** option is selected (**FAX** is used to forward calls to a single extension, such as your FAX machine's extension) and click **Apply**.

Figure 45 Confirm AA Setting

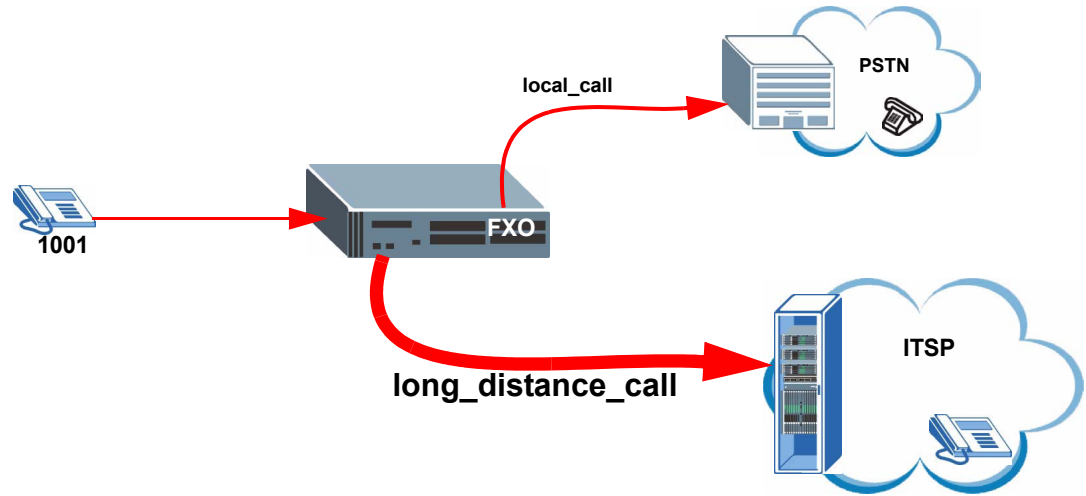


- 7 People from the outside world can now call the X6004 using the numbers provided by your ITSP. The **Default AA** prompts the callers to dial the extension they would like to reach. See [Section 3.3.2 on page 59](#) for information on how to set up a dialing rule so that the extensions on your network can make calls via your ITSP.

3.3.2 Dialing Rule for ITSP

In our example we want to use the **ITSP1** outbound line group to complete long distance calls. This is done by configuring the **long_distance_call** LCR. This figure also shows the **local_call** LCR we created in [Section 3.2.2 on page 52](#).

Figure 46 Outbound Calls via ITSP



Procedure:

- 1 In the web configurator, click **Configuration > PBX > Outbound Line Management > LCR** to open the following screen.

Figure 47 Configuration > PBX > Outbound Line Management > LCR

The screenshot shows the 'LCR List' configuration page. It features a table with the following data:

LCR Name	Comment
ezout	easy to call out
local_call	local call LCR
long_distance_call	long distance call LCR
international_call	international call LCR

The 'long_distance_call' row is highlighted, and the edit icon (pencil) for this row is circled in red. Above the table are buttons for 'Delete', 'Add', 'Edit', and 'Delete'. Below the table is a 'Delete' button.

- 2 Click the **Edit** icon in the **long_distance_call** section to open the following screen. Select the outbound line group from the pool column that you want to add to this LCR (in our example this is **IPPBX_001:ITSP1** as configured in [Section 3.3.1 on page 55](#)), then click the **Right** icon to move it to the **Selected** column. Click **Apply** to save the outbound line group in the LCR and then click the **Add** icon to configure a dial condition.

Figure 48 long_distance_call LCR

The screenshot shows the 'LCR List / LCR Item' configuration window. Under the 'LCR Data' tab, the 'long_distance_call' LCR is being edited. The 'Outbound line group' section has two columns: 'Pool' and 'Selected'. 'IPPBX_001:ITSP1' is currently in the 'Pool' column and has been moved to the 'Selected' column, indicated by a red circle around it. Below these columns are 'Apply' and 'Cancel' buttons, with 'Apply' circled in red. At the bottom, the 'Dial Condition List' section is visible, showing a 'Delete' button and a 'Dial Condition' field. The 'Add' icon (a plus sign in a circle) at the end of the 'Dial Condition' field is also circled in red.

- 3 The **Dial Condition** screen appears as shown.
 - Type **1XXXXX** followed by a period (.) in the **Dial Condition** field. This means that this LCR will be used when callers dial any 7 or greater digit number that begins with a **1**. The **X** stands for any digit 0 to 9 and is used to create a minimum length condition. The period (.) is a wildcard indicating that any number can follow the **1XXXXX** condition.
 - Test the dial condition. In our example, we tested the number **1212555555** to see if it matches our dial condition. You can test any number by typing it in the **Number Pattern Test** field and clicking the **Right** icon; an **O** appears if the number typed in matches the dial condition and an **X** appears if it does not match the dial condition.
 - Specify an offset value. In our example, we configure an offset value of **1**. The offset value tells the X6004 how many initial digits (if any) it should strip off of the dialed number before routing the call to the external line.
 - Specify a prefix number. In this example, our ITSP has a special dial plan for long distance calls. A caller must dial **016** in order to take advantage of the dial plan. By adding **016** in the **Prefix** field, the X6004 automatically adds **016** to calls that match this dial condition. See [Figure 52 on page 62](#) for an example.
 - Click **Apply** to save your settings.

Figure 49 Dial Condition for long_distance_call LCR

LCR List / LCR Item / Dial Condition

Dial Condition

LCR Name: long_distance_call

Dial Condition: 1XXXXX.

Number Pattern Test: 1212555555

Dial Number Viewer:

Channel	Offset	Length	Prefix	Postfix
IPPBX_001:ITSP1	1		016	

Apply Cancel

- 4 You are done configuring the LCR. However, before it can be used by any of the phones connected to the X6004, the LCR needs to be assigned to an appropriate authority group.

3.3.3 LCR to Authority Group Assignment

The **Group Management** screen allows you to give an authority group (and the extensions in that group) the right to use an LCR (outbound dial condition). In our example, we give the authority group **Basic** the right to call out using the LCR **long_distance_call**.

Procedure:

- 1 Click **Configuration > PBX > Group Management** to view the following screen.

Figure 50 Configuration > PBX > Group Management

Group Management

Authority Group

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	Basic		

FXO Trunk

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	PSTN1		

SIP Trunk

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	ITSP1		

Trusted Peer

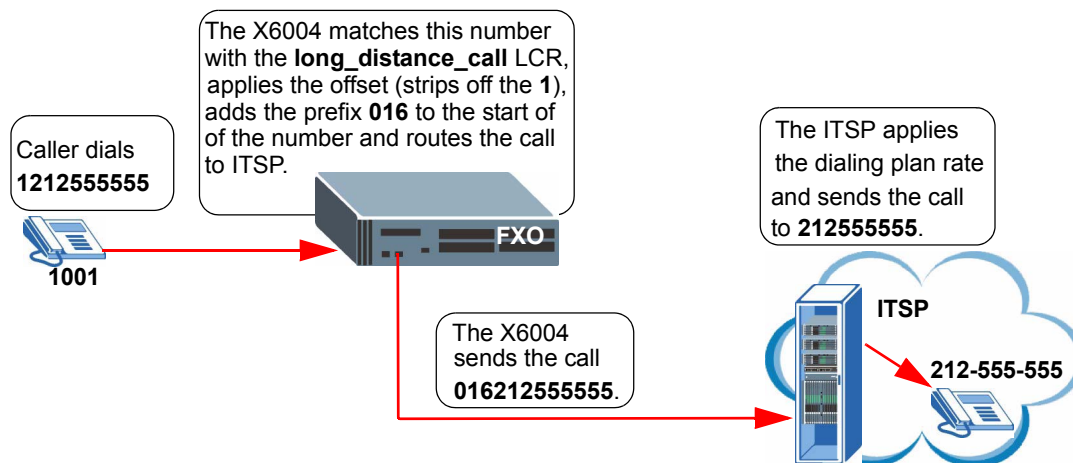
Machine ID	Group Name	Description	Advanced Setting
------------	------------	-------------	------------------

- 2 Click the **Advanced** icon in the **Authority Group** section (in this example there is only one authority group - **Basic**) of the screen to view the screen as shown. Select the checkbox in the **Advanced** column of the **long_distance_call** LCR as shown below. Click **Apply**.

Figure 51 LCR to Authority Group Assignment

Group Management			
Accessible Group List			
Group Name Basic			
Group Name	Description	Group Type	Advanced Setting
ezout	easy to call out	LCR	<input type="checkbox"/>
local_call	local call LCR	LCR	<input checked="" type="checkbox"/>
long_distance_call	long distance call LCR	LCR	<input checked="" type="checkbox"/>
international_call	international call LCR	LCR	<input type="checkbox"/>

- 3 You can now use the telephones that are part of the **Basic** authority group to make long distance calls using the ITSP connection. The following figure summarizes the outbound call process for this example.

Figure 52 Outbound Calls via ITSP

3.4 Using Call Features

The X6004 has built-in call features for functions such as call forwarding, call blocking, voicemail and so on. These features can be activated or accessed by dialing specific numbers from the phones connected to the X6004. The numbers used to access call features are called call feature codes. This section shows you how to customize call features. It also describes how to configure a ZyXEL IP phone (V300 is used in our example) to access voicemail by using the voicemail feature code. See [Section 7.5 on page 100](#) for more information on all call features.

3.4.1 Customizing Feature Codes

Click **Configuration > PBX > Server Configuration > SIP Server > Feature Code** to display the codes used for the X6004's call features. You can change the codes in this screen. Provide the users with a list of the features and corresponding codes. Users on your network can then dial a code from their telephone to activate a specific feature. For example, dialing ***96** transfers a call.

Figure 53 Configuration > PBX > Server Configuration > SIP Server > Feature Code

Global set	FXD	FXS	Call Block(AA)	Feature Code
Feature code setting				
Black List On	*67	Black List Off	*85	
Block no ID On	*77	Block no ID Off	*87	
Call Forward On	*72	Call Forward Off	*73	
Call Forward IVR	*74	Call Forward Busy On	*90	
Call Forward Busy Off	*91	Call Forward Busy IVR	*92	
Call Forward No Answer On	*82	Call Forward No Answer Off	*83	
Call Forward No Answer IVR	*84	Call Transfer	*96	
Direct Pickup	*95	DND On	*78	
DND Off	*79	DND IVR	*80	
Follow Me On	*22	Follow Me Off	*23	
Group Pickup	*94	Personal IVR	*	
Voice Mail	**			

Apply Reset

3.4.2 Using the Voicemail Feature

The voicemail feature code as assigned in [Section 3.4.1 on page 62](#) is **. Users can dial ** followed by their extension number to access their voicemail. For example, a caller from extension **1001** can dial ****1001** to access voicemail messages.

Some IP phones allow you to configure automatic dialing of feature codes to perform common tasks. The following figure shows the web configurator screen of ZyXEL's V300 IP phone. ZyXEL's V300 IP phone can be configured to automatically access voicemail by pressing the **VOICE MAIL** button located on its keypad. This is done by typing the call feature number into the **Voice Mail Number:** field.

Figure 54 ZyXEL V300 Voicemail Configuration

SIP Settings	QoS
SIP Settings	
SIP Account:	SIP 1
<input checked="" type="checkbox"/> Active	
Number:	1001
SIP Local Port:	5060 (1024-65535)
SIP Server Address:	172.23.37.201
SIP Server Port:	5060 (1024-65535)
REGISTER Server Address:	172.23.37.201
REGISTER Server Port:	5060 (1024-65535)
SIP Service Domains:	172.23.37.201
<input checked="" type="checkbox"/> Send Caller ID	
Voice Mail Number:	**1001
<input type="checkbox"/> DNS SRV	

EXAMPLE

Phone User Tutorial

4.1 Using Your Web Portal

Every phone user has a personal web portal on the X6004. You can log in and make changes to your account setup, and IP phone users also use the web phone. The web phone is just like the telephone you usually use to make calls from this extension; you can call all the same numbers in the same way.

The following sections show examples of how to access the X6004's web portal, configure your own personal settings, and use the web phone.

4.1.1 Your Information

In this example, your network administrator has given you some information, as shown in the following table. You can also use this table to note down your own personal information, if you like.

Table 4 Your Information

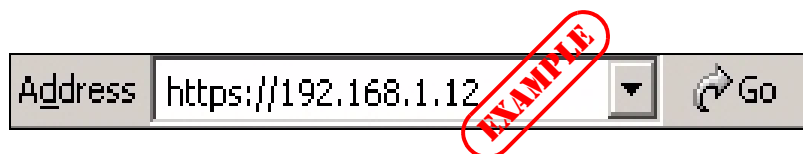
	EXAMPLE INFORMATION	YOUR INFORMATION
Extension Number	1001	
PIN Code	5678	
Web Portal IP Address	https://192.168.1.12	

4.1.2 Accessing the Web Portal

Take the following steps to access your phone account's web portal.

Open a web browser (like Internet Explorer) and enter the IP address you were given.

Figure 55 Tutorial: Web Portal IP Address





Don't forget the "s" in "https://" - this "s" indicates a secure IP address, which means that communication between your computer and the X6004 (including your phone calls) cannot be intercepted by anyone else.

The following screen displays.

Figure 56 Tutorial: Log In

Enter your extension number ("1001") in the **Extension** field, and enter your PIN code ("5678") in the **PIN Code** field. Click **Login**.

4.1.3 Changing Your Security Information

It is very important that you change your security information as soon as possible, since it could be guessed by others if it was generated automatically.

Figure 57 Tutorial: Peer Info Tab



The **Peer Info** screen displays when you log in. It allows you to change the password for your VoIP account (displayed as **SIP Auth Password**) and the PIN code you use to access the web portal, voicemail and the IVR (Interactive Voice Response) system (displayed as **Web/IVR/VM PIN Code**).



The **SIP Auth Password** field does not display if you connect to the X6004 using a regular analog telephone system.

Figure 58 Tutorial: Changing Security Information

SIP Peer 1001 configuration and information

Group	Sales		
SIP Auth. User Name	1001		
SIP Auth. Password	****	(Confirm	****)
Web/IVR/VM PIN Code	****	(Confirm	****)

Apply Reset

- Enter the new **SIP Auth Password** in the field on the left, and enter it again in the field on the right. Click **Apply**.
- Enter the new **Web/IVR/VM PIN Code** in the field on the left, and enter it again in the field on the right. Click **Apply**.

4.1.4 Personalizing Your Settings

Next, configure your extension's call settings. Click the **Forward/Block** tab at the top of the screen.

Figure 59 Tutorial: Forward / Block Tab



The following screen displays.

Figure 60 Tutorial: Configuring Call Settings

The following table shows the example call setting information. You can also use this table to make a note of the call settings you want to configure, if you like.

Table 5 Tutorial: Call Settings

	EXAMPLE INFORMATION	YOUR INFORMATION
Office Hours	Monday ~ Friday, 09:00 ~ 17:30	
Do Not Disturb (no-one can call you, except for people on the White List)	Disable	
White List (people who can still call you when Do Not Disturb is on)	555 123456 555 234567 555 345678 555 456789	
Call Forwarding (whether or not incoming calls are redirected, and where they are sent)	Blind Forward: Disable Busy Forward: Voicemail No Answer Forward: Find Me List After Office Hours: Voicemail	
Find Me List (other extensions where you might be found)	987 654 321	
Black List (people you don't want to call you at all)	555 999888 555 888777	
Block Calls Without Caller ID	Disable	

Take the following steps to configure this screen.

- 1 Office Hours:** Ensure that the **Mon** through **Fri** boxes are checked. Clear the **Sat** and **Sun** boxes.

In the **Time** field, use the drop-down lists to enter **09 : 00 ~ 17 : 30**.

- 2 Do Not Disturb:** Ensure that **Disable** is selected. You can turn this on later if you want.
- 3 White List:** Click the **White List** button. In the screen that displays, enter each phone number in the **Number** field and click **Add** after each one. Click **Apply** when you are finished.

Figure 61 Tutorial: DND White List

- 4 Call Forwarding:** Ensure that **Blind Forward** is set to **Disable**. In the **Busy Forward** row, select **Voice Mail**. In the **No Answer Forward** row, select **Enable** and click **Find Me List**.

In the screen that displays, enter each phone number in the **Number** field and click **Add** after each one. Click **Apply** when you are finished.

Figure 62 Tutorial: Find Me List

In the **After Office Hours** row, select **Voice Mail**.

- 5 Black List:** Select **Enable** and click the **Black List** button. In the screen that displays, enter each phone number in the **Number** field and click **Add** after each one. Click **Apply** when you are finished.

Figure 63 Tutorial: Black List

6 Block Calls Without Caller ID: Ensure that **Disable** is selected.

7 Click Apply. Your call settings are successfully configured!

4.1.5 Setting Up Voicemail

Next, you can set up your voicemail inbox to automatically send your received messages as audio files to your email inbox. It is recommended that you do this so that your voicemail inbox does not fill up (if it fills up, no new messages can be recorded).

Click the **Voice Mail** tab at the top of the screen.

Figure 64 Tutorial: Voicemail Tab



The following screen displays.

Figure 65 Tutorial: Setting Up Voicemail

The following table shows the example voicemail settings. You can also use this table to make a note of the voicemail settings you want to configure, if you like.

Table 6 Tutorial: Voicemail Settings

	EXAMPLE INFORMATION	YOUR INFORMATION
Received E-mail Address (the address to which you want the voicemail sent)	user_abcd@examplecorp.com	
Attached Voice File (send the audio file to your email account)	Yes	
Delete Voice Message After Mailed	Yes	

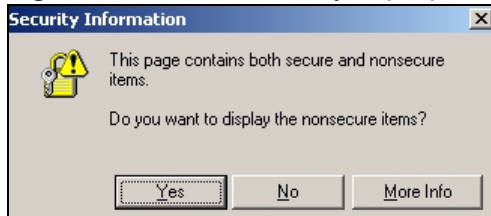
To configure this screen, enter your email address in the **Received E-mail Address** field, select **Attached Voice File** and select **Delete Voice Message After Mailed**. Click **Apply**.

4.1.6 Using the Web Phone (IP Phone Users Only)

Click the **Web Phone** tab at the top of the screen.

Figure 66 Tutorial: Web Phone Tab

If a screen similar to the following displays, click **Yes**.

Figure 67 Tutorial: Security Pop-Up








The following screen displays.

Figure 68 Tutorial: The Web Phone

Make sure you have a headset (or speakers and a microphone) connected to your computer, and that your soundcard is working correctly (try listening to an audio file or recording a voice note to check, if there is a problem).

The following table describes how to use the web phone to perform some basic phone functions.

Table 7 Tutorial: Basic Web Phone Call Features

FEATURE	PROCEDURE
Dial a number	Click each numeral using the mouse pointer. The number displays on the screen. Use the “Clear” () button to delete a numeral.
Make a call	Dial the number, then press the “Dial/Pick up” () button.
Receive a call	When a call is incoming, press the “Dial/Pick up” () button.
End a call	Press the “Hang up” () button.
Adjust the speaker volume	Use the  slider on the left of the keypad.
Adjust the microphone volume	Use the  slider on the right of the keypad.
Mute the speakers and the microphone	Click the Mute button below the keypad.
Use the phone book	Click the Phone Book tab to the right of the web phone. The phone book appears, displaying your contact list. Select what you want to search for (a name or extension number, for instance) from the drop-down list, enter the search term in the box and click on the magnifying glass () to search. You can also arrange the contact list entries by clicking on one of the headings.

PART II

Web Configurator & Network Setup

The Web Configurator (75)

Network Deployment (85)

The Web Configurator

This section introduces the configuration and functions of the web configurator.

5.1 Introduction

The web configurator is an HTML-based management interface that allows easy X6004 setup and management via an Internet browser. Use Internet Explorer 6.0 and later or Netscape Navigator 7.0 and later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the web configurator you need to allow:

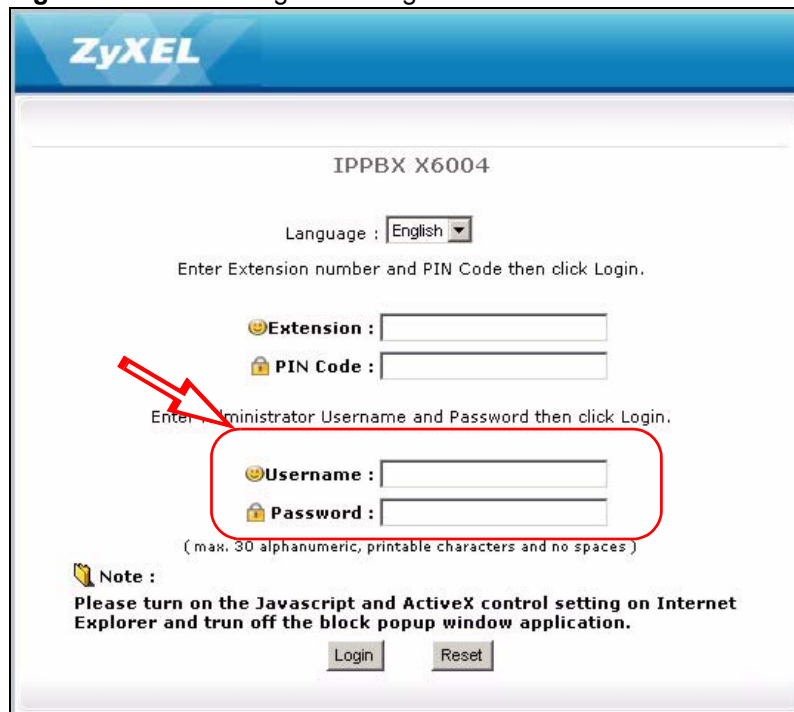
- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScript (enabled by default).
- Java permissions (enabled by default).

5.2 System Login

- 1 Start your web browser.
- 2 Type “https://” and the IP address of the X6004 (for example, the default LAN IP address is **192.168.1.12** and the default WAN IP address is **172.16.1.1**) in the Location or Address field. Press [ENTER].
- 3 The login screen appears. The default username is **admin** and associated default password is **1234**. Enter your login credentials and click **Login**.




The upper part of the login screen is for logins into the web phone feature. See [Chapter 32 on page 265](#).

Figure 69 Web Configurator: Login


The image shows the login page of the ZyXEL IPPBX X6004 web configurator. At the top is the ZyXEL logo. Below it, the text 'IPPBX X6004' is displayed. A language dropdown menu is set to 'English'. The instructions state: 'Enter Extension number and PIN Code then click Login.' There are two input fields: 'Extension :' and 'PIN Code :'. Below these, the instructions state: 'Enter Administrator Username and Password then click Login.' The 'Username :' and 'Password :' input fields are highlighted with a red rectangle, and a red arrow points to the 'Username :' field. A note below the fields states: '(max. 30 alphanumeric, printable characters and no spaces)'. At the bottom, there is a 'Note' section with a warning icon, stating: 'Please turn on the Javascript and ActiveX control setting on Internet Explorer and turn off the block popup window application.' Below the note are 'Login' and 'Reset' buttons.

- 4 A screen opens up prompting you to change the default user name and password. Change the default password, note it down and put it in a safe place. Click **Apply** to go to the status screen of the web configurator.



The image shows the 'Username/Password Setup' page of the ZyXEL web configurator. It features a padlock icon and the title 'Username/Password Setup'. The text reads: 'As a security precaution, it is highly recommended that you change the admin username & password.' There are four input fields: 'Old Password :', 'Username', 'Password', and 'Password Confirm'. Below the fields, a note states: '(max. 30 alphanumeric, printable characters and no spaces)'. At the bottom are 'Apply' and 'Ignore' buttons.

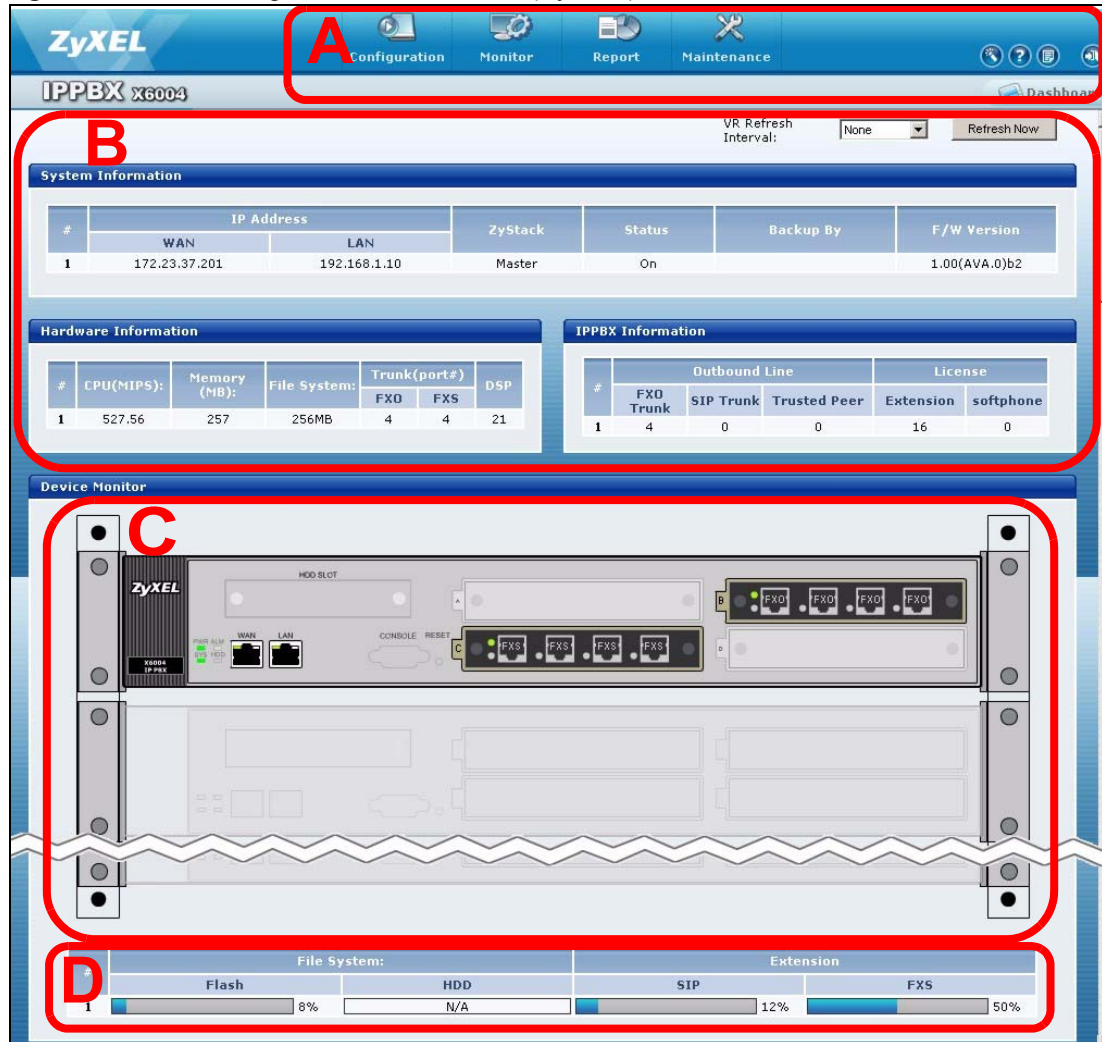


The first time you log in to the X6004 a wizard guides you through initial network configuration. See the Quick Start Guide for an initial setup example.

5.3 The System Screen

The **System** screen is the first screen that displays when you access the web configurator. The following figure shows the navigating components of the web configurator screen.

Figure 70 Web Configurator Home Screen (System)



A - The navigation buttons link you to configuration menus of the X6004, the quick keys allow you to view built-in help files, access the wizard, view the about screen and logout. Use the **Dashboard** key to go to the main status page from any web configurator screen.

B - The main part of the screen displays general information about the X6004 you are logged in to and any X6004 that are part of a ZyStack (see [Chapter 23 on page 207](#)).












C - The device monitor is a graphical representation of the X6004 status and other X6004 in a ZyStack. You can quickly view LED status, voice interface card status and peer X6004 status. Click on the ZyXEL logo to go to the status screen of the X6004 or click on the individual ports to go to their configuration screens.

D - The bottom part of the screen shows you the amount of flash memory used as well as the extension capacity for the FXS ports and SIP accounts.

5.3.1 The Navigation Panel

Go to individual feature configuration screens via the navigation buttons. The following table shows you the submenus (navigation panels) associated with each navigation button.

Table 8 Navigation Buttons Sub-links Overview

CONFIGURATION	MONITOR	REPORT	MAINTENANCE
 Network ▲ ■ LAN ■ WAN ■ DDNS ■ NTP ■ Static Route  PBX ▲ ■ Server Configuration ■ Extension Management ■ Outbound Line Management ■ Group Management ■ Call Services  ZyStack ▲ ■ Setting ■ Intranet ■ Status	 Monitor ▲ ■ System Information  Status Observation ▲ ■ SIP Peer ■ FXS Peer ■ FXO ■ SIP Trunk	 LOGS ▲ ■ System Log ■ CDR	 Administration ▲ ■ Administrator Username/Password ■ Administrator List ■ Diagnostics  Backup & Restore  Firmware Upgrade  License Control ▲ ■ Registration  Reboot

The following table describes the links in the navigation panels.

Table 9 Navigation Panel Links

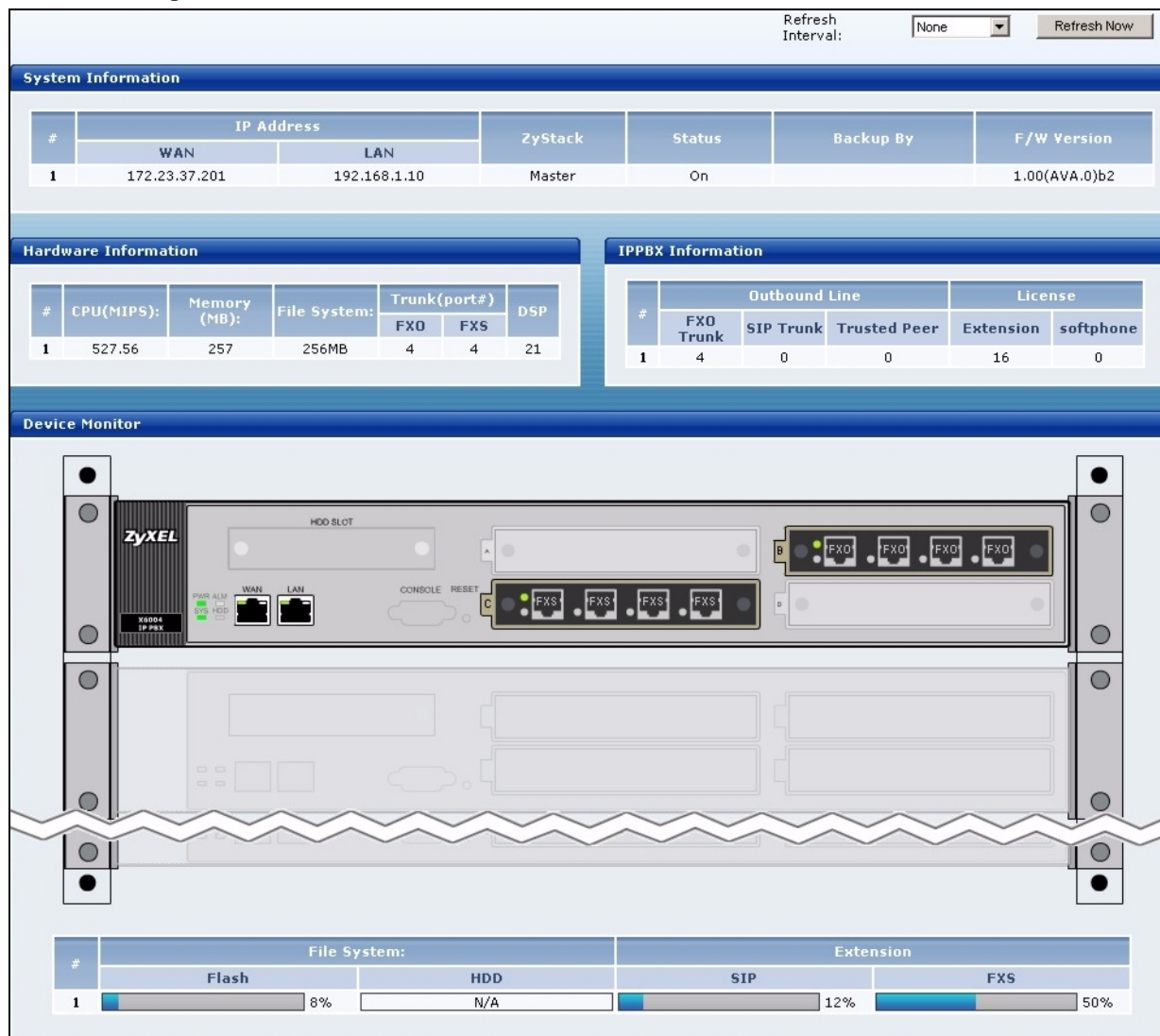
LINK	DESCRIPTION
Network	Use these screens to configure network settings on the X6004.
LAN	Use this screen to configure the LAN IP address of the X6004.
WAN	Use this screen to configure the WAN IP address of the X6004.
DDNS	Use this screen to specify DNS servers that the X6004 uses for domain name to IP address mappings.
NTP	Use this screen to configure the time settings on the X6004.
Static Route	Use this screen to specify any static routes for the X6004.
PBX	Use these screens to configure settings related to the telephony functions of the X6004.
Server Configuration	Use these screens to configure the SIP server, auto provisioning, quality of service, voice mail, phonebook, DSP (Digital Signal Processor) and office hour settings.
Extension Management	Use this screen to create and manage extension numbers for the IP and FXS (analog) phones connected to the X6004.
Outbound Line Management	Use this screen to configure outbound line configurations to FXO, ITSP and SIP peer connections.
Group Management	Use this screen to associate groups with dialing rules. This specifies which outbound lines members of a department can use.
Call Services	Use these screens to configure emergency call settings, conference calling, music on hold settings, distinctive ring settings, auto callback and call parking.
ZyStack	Use these screens to configure a group of X6004's to work together.
Setting	Use this screen to add peer X6004s.

Table 9 Navigation Panel Links (continued)

LINK	DESCRIPTION
Intranet	Use this screen to specify IP subnets for which the X6004 routes IP phones to a ZyStack member.
Status	Use this screen to check the status of peer X6004s.
Monitor	These screens allow you to view the status of your X6004 or if you set up a ZyStack you can view the status of all the participating X6004s.
System Information	Use this screen to view network configuration, hardware information, line and license settings on the X6004.
Status Observation	Use these screens to view status details about extensions and outbound line groups configured on the X6004.
SIP Peer	Use this screen to view status information about SIP extensions configured on the X6004.
FXS Peer	Use this screen to view status information about FXS extensions configured on the X6004.
FXO Peer	Use this screen to view status information about FXO outbound line groups configured on the X6004.
SIP Trunk	Use this screen to view status information about SIP outbound line groups configured on the X6004.
Logs	Use these screens to view system logs, configure log settings and search the CDR (Call Detail Record) database.
System Logs	Use these screens to view and configure system logs on the X6004.
CDR	Use these screens to manage CDR collection and to query the CDR database.
Administration	Use these screens to manage administrator accounts and use diagnostic features on the X6004.
Administrator Username/ Password	Use this screen to change the password of the currently logged in administrator account.
Administrator List	Use this screen to manage administrator accounts on the X6004.
Diagnostics	Use this screen to configure data capture of VoIP packets for analysis.
Backup & Restore	Use this screen to backup and restore the configuration or reset the X6004 to its factory defaults.
Firmware Upgrade	Use this screen to perform firmware upgrades on the X6004.
License Control	Use this section to make sure that your X6004 is registered with myZyXEL.com.
Registration	Use this screen to register your X6004 with myZyXEL.com. If you don't have an account with myZyXEL.com, follow the directions in this screen to set one up.
Reboot	Use this screen to reboot the X6004.

5.4 Dashboard - System Information

The **Dashboard** screen contains system information about the X6004. It is also a graphical representation of the X6004 and any ZyStack members (if configured). Click the **Dashboard** button in any of the web configurator screens to view the screen as shown.

Figure 71 Dashboard

Each field is described in the following table.

Table 10 Dashboard

LABEL	DESCRIPTION
Refresh Interval	Select how often you want to update the information in the Dashboard screen and click Refresh Now to apply your setting. You can also click Refresh Now to update the screen immediately.
System Information	
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
IP Address	These two fields display the IP addresses of the of the WAN and LAN interfaces on the X6004.
ZyStack	This field displays: Master - if the X6004 is the master for all of the X6004s in a ZyStack. This field also displays Master if this X6004 is set up as a stand alone IP PBX. Slave - if this X6004 is a slave in a ZyStack.

Table 10 Dashboard (continued)

LABEL	DESCRIPTION
Status	This field displays: On - If the X6004 is powered on. Off - If this X6004 is not receiving power.
Backup By	Displays the IP address of the X6004 that serves as the backup IPPBX for this X6004 (only applicable in a ZyStack configuration).
F/W Version	This field displays the firmware version currently installed on the X6004.
Hardware Information	
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
CPU(MIPS)	This field displays the speed of the processing chip on the X6004 in MIPS (Millions of Instructions Per Second).
Memory(MB)	This field displays the total RAM memory available on the X6004. This is the memory available for processing functions on the X6004.
File System	This field displays the total memory available for the files system on the X6004. The file system stores information such as configuration settings, CDR and voicemail. This number is the sum of the built in flash memory and the optional hard disk (if installed).
Trunk(port#)	These fields display the number of FXO ports (ports leading to the PSTN) and the number of FXS ports (ports leading to analog phones on your network) installed on the X6004.
DSP	This field displays the capacity of the DSP (Digital Signal Processing) modules installed on the X6004. The capacity is displayed in the number of channels the X6004 can process at any one time.
IPPBX Information	
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
Outbound Line	These fields display the number of outside lines configured on the X6004. They are divided into the following categories: <ul style="list-style-type: none"> • FXO Trunk - connections via the FXO ports to your local telephone company. • SIP Trunk - connections to a SIP server at your VoIP provider. • Trusted Peer lines - connections to a peer SIP device. A peer SIP device could be another X6004 or another SIP server that allows you to use its services.
License	These fields display the number of licenses you have for subscription services via myZyXEL.com website. The services are divided into the following categories: <ul style="list-style-type: none"> • Extension - This is the number of SIP extensions you can configure on the X6004. • softphone - This is the number of ZyXEL's V100 softphones you can register with the X6004.
Device Monitor	This section is a graphical representation of the X6004 status and other X6004 in a ZyStack. You can quickly view LED status, voice interface card status and peer X6004 status. You can also view additional basic information by moving your mouse cursor over the ZyXEL logo or the port graphics in the display. Click on the on the ZyXEL logo to go to the status screen of the X6004 or click on the individual ports (WAN, LAN or interface card ports) to go to their configuration screens.

Table 10 Dashboard (continued)

LABEL	DESCRIPTION
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
File System	<p>These fields display the current utilization of the available memory on the X6004. They are divided into the following categories:</p> <ul style="list-style-type: none"> • Flash - This field displays the percentage of the total built in memory currently being used up on the X6004. • HDD - This field displays the percentage of your hard disk memory (if a hard disk is installed) currently used up on the X6004.
Extension	<p>These fields display the utilization percentage of your available SIP extensions and FXS extension. An extension is considered to be utilized as soon as it is created.</p> <p>The number of SIP extensions you are allowed to create on the X6004 is limited by the subscription service on the X6004.</p> <p>The number of FXS extensions you are allowed to create on the X6004 is limited by the number of FXS ports you have installed on the X6004. The FXS ports are used to connect analog phones to the X6004.</p>

5.5 Saving Your Configuration

When you are done modifying the settings in a screen, click **Apply** to save your changes.

5.6 Icons in the Web Configurator

The following table describes the icons used in the configuration screens of the X6004.

Table 11 Icon Explanation Table













ICON	NAME	DESCRIPTION
	Add	This icon is used to create new components, such as extensions or groups.
	Edit	This icon takes you to a screen where you can perform basic configuration changes.
	Advanced	This icon takes you to the main configuration screen of most features.
	Delete	Use this icon to remove components, such as extensions or groups.
	Auto Attendant	This screen takes you to a screen where you can select an auto attendant.
	Reboot	This icon reboots the X6004 or another member of a ZyStack (if configured).
	Up	This icon is used to move items higher in priority.
	Down	This icon is used to move items lower in priority.

Table 11 Icon Explanation Table (continued)

ICON	NAME	DESCRIPTION
 or 	Left	Use this icon to move selected items from right to left in a screen.
 or 	Right	Use this icon to move selected items from left to right in a screen.

5.7 Resetting the X6004

If you forget the administrator password, you will need to reset the X6004 back to the factory defaults.

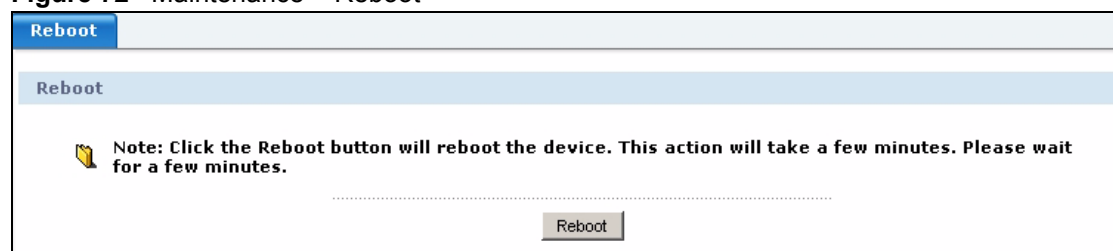
Use the **RESET** button on the front panel of the X6004 to reset the X6004 back to factory defaults. Press and hold the **RESET** button for 10 seconds. The X6004 will reload its factory defaults.

The X6004 is reinitialized with a default configuration file including the default administrator username (admin) and password (1234). The LAN IP address of the X6004 also reverts to the default 192.168.1.12 and the WAN IP address reverts to 172.16.1.1.

5.8 Rebooting the X6004

If the X6004 is not performing as expected, you can reboot the system as a basic troubleshooting step. Rebooting the X6004 does not change any of the configuration settings. Rebooting simply restarts all of the subsystems (voice processing, network interfaces and so on) and reloads the latest saved configuration on the X6004.

Click **Maintenance > Reboot** to open the **Reboot** screen. Click the **Reboot** button to restart the X6004.

Figure 72 Maintenance > Reboot

5.9 Logging Out of the Web Configurator


Click the **Logout button** () in the navigation panel to exit the web configurator. You have to log in with your password again after you log out. This is recommended after you finish a management session for security reasons.

Figure 73 Web Configurator: Logout Link

5.10 Help

The web configurator's online help has descriptions of individual screens and some supplementary information.

Click the **Help** (?) link from a web configurator screen to view an online help description of that screen.

Network Deployment

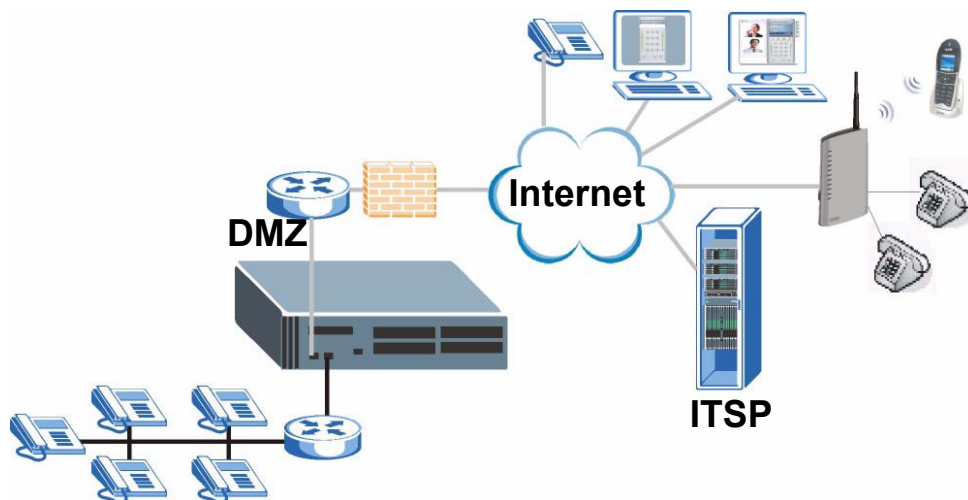
This chapter shows you how to deploy the X6004 on your network.

6.1 Network Deployment Overview

The following diagram shows a sample network deployment of the X6004. The WAN port is connected to a DMZ interface on the default gateway router. The X6004 uses the WAN interface to connect to a SIP server at the ITSP. SIP IP devices use the WAN IP address of the X6004 to connect to it.

On the LAN, SIP IP phones use the LAN IP address of the X6004 to connect to it.

Figure 74 Network Deployment Overview



When you deploy the X6004, you must consider the following:

- If the X6004 has dynamically assigned IP address from your ISP, then you should configure DDNS (Dynamic DNS). DDNS maps your dynamic IP address to a static domain name. This allows the IP devices on the WAN to establish connections with the X6004.
- If the X6004 is behind a firewall, then you must make sure that you create firewall rules to let VoIP traffic pass through to the X6004.
- If the X6004 is behind a NAT router, then you must make sure that you configure forwarding rules for VoIP communication to get to the X6004.
- If the IP phones on your LAN are located in different subnets, then you have to configure static routes to ensure that the IP phones can connect to the X6004 and vice versa.

6.2 LAN Configuration

Use this screen to set up the LAN IP address of the X6004. To access this screen, click **Configuration > Network > LAN**.

Figure 75 Configuration > Network > LAN

The screenshot shows a web interface for LAN configuration. At the top, there's a tab labeled 'LAN'. Below it, the title is 'LAN Ethernet TCP/IP Settings'. There are two input fields: 'IP Address' with the value '192.168.1.12' and 'Subnet Mask' with the value '255.255.255.0'. At the bottom, there are two buttons: 'Apply' and 'Reset'.

Each field is described in the following table.

Table 12 Configuration > Network > LAN

LABEL	DESCRIPTION
LAN Ethernet TCP/IP Settings	The IP address you configured here is the SIP server IP address that the IP phones on your LAN connect to.
IP Address	Enter the IP address of the X6004 on the LAN.
IP Subnet Mask	Enter the subnet mask of the LAN.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to set every field in this screen to its last-saved value.

6.3 WAN Configuration

You can configure your connection to the ISP or the default gateway router as well as DNS server information. This allows the X6004 to communicate with IP devices on the WAN.

6.3.1 DNS Server Address Assignment

Use DNS (Domain Name System) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of www.zyxel.com is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of any network device before you can access it.

The ISP (or network administrator) should tell you the DNS server addresses, usually in the form of an information sheet, when you sign up. Enter them in the **Primary DNS** and **Secondary DNS** server fields in the **Configuration > Network > WAN** screen.

6.3.2 Configure WAN Settings

Use this screen to set up a connection with the ISP or the default gateway router. To access this screen, click **Configuration > Network > WAN**.

Figure 76 Configuration > Network > WAN

WAN

WAN Ethernet TCP/IP Settings

☐ Get automatically from ISP Renew

☒ Static IP (Default)

IP Address: 172.23.37.201

Subnet Mask: 255.255.255.0

Default Gateway: 172.23.37.254

Primary DNS: 172.23.5.1

Secondary DNS: 172.23.5.2

Apply Reset

Each field is described in the following table.

Table 13 Configuration > Network > WAN

LABEL	DESCRIPTION
WAN Ethernet TCP/IP Settings	
Get automatically from ISP	Select this if your ISP did not assign you a static IP address. Click Renew to send a request to the DHCP server for a new IP address.
Static IP (Default)	Select this if your ISP or network administrator assigned you a static IP address.
IP Address	Enter the IP address provided by your ISP or network administrator.
Subnet Mask	Enter the subnet mask your ISP or network administrator provided for the remote node.
Default Gateway	Enter the IP address your ISP or network administrator provided for the default gateway to the Internet.
Primary DNS	Enter the IP address of the DNS server your ISP or network administrator provided to you.
Secondary DNS	Enter the IP address of the second DNS server your ISP or network administrator provided to you. If you were not provided one, leave this field blank.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to set every field in this screen to its last-saved value.

6.4 DDNS (Dynamic DNS)

Dynamic DNS allows you to map your current dynamic IP address with one or many dynamic DNS services so that anyone can contact you. SIP IP phones can access the SIP server on the X6004 using a domain name (for instance myhost.dhs.org, where myhost is a name of your choice) that will never change instead of using an IP address that changes each time you reconnect.

First of all, you need to have registered a dynamic DNS account with www.dyndns.org. This is for people with a dynamic IP from their ISP or DHCP server that would still like to have a domain name. The Dynamic DNS service provider will give you a password or key.

6.4.1 DYNDNS Wildcard

Enabling the wildcard feature for your host causes *.yourhost.dyndns.org to be aliased to the same IP address as yourhost.dyndns.org. This feature is useful if you want to be able to use, for example, www.yourhost.dyndns.org and still reach your hostname.

If you have a private WAN IP address, then you cannot use Dynamic DNS.

6.4.2 DDNS Configuration

Use this screen to configure your Dynamic DNS settings. To access this screen, click **Configuration > Network > DDNS**.

Figure 77 Configuration > Network > DDNS

The screenshot shows the 'DDNS Type' configuration page. It has a title bar 'DDNS Type' and a sub-header 'Basic Setting'. The form contains the following fields: 'DDNS Type' (a dropdown menu set to 'DynDNS'), 'Username' (a text input field), 'Password' (a text input field), 'Domain name' (a text input field), 'Wildcard' (a checkbox), 'Interface' (a text input field with 'WAN' entered), and 'Mail Exchanger' (a text input field with '(optional)' to its right). At the bottom right are 'Apply' and 'Reset' buttons.

Each field is described in the following table.

Table 14 Configuration > Network > DDNS

LABEL	DESCRIPTION
DDNS Type	Select the type of service that you are registered for with your Dynamic DNS service provider.
User Name	Type your user name.
Password	Type the password assigned to you.
Domain name	Type the domain name assigned to your X6004 by your Dynamic DNS provider. You can specify up to two host names in the field separated by a comma (",").
Enable Wildcard Option	Select the check box to enable DynDNS Wildcard.
Interface	This field displays the interface registered to use DDNS services. On the X6004 it always displays "WAN".
Mail Exchanger	Use this field if the mail exchange server in your organization has a dynamically assigned IP address and you have not already registered it with a Dynamic DNS provider. Enter the domain name of your mail exchange server.
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

6.5 NTP (Network Time Protocol) Configuration

Use this screen to configure time settings on the X6004. To access this screen, click **Configuration > Network > NTP**.

Figure 78 Configuration > Network > NTP

The screenshot shows the NTP Configuration interface with the following sections:

- Current Time and Date:** Displays the current time (14:31:28) and date (2007-01-22).
- Time and Date Setup:**
 - Manual:** Radio button selected. Fields for New Time (14:31:23) and New Date (2007-01-22).
 - Get from Time Server:** Radio button selected. Fields for Time Server Address 1 (0.pool.ntp.org) and Time Server Address 2 (1.pool.ntp.org).
- Time Zone Setup:**
 - Time Zone:** Dropdown menu showing (GMT+08:00) Beijing, Hong Kong, Perth, Singapore, Taipei.
 - Enable Daylight saving:** Checkbox (unchecked).
 - Start Date:** First Monday of January at 12:00.
 - End Date:** Second Monday of January at 12:00.
 - Offset:** 1 hours.

Buttons for **Apply** and **Reset** are at the bottom.

Each field is described in the following table.

Table 15 Configuration > Network > NTP

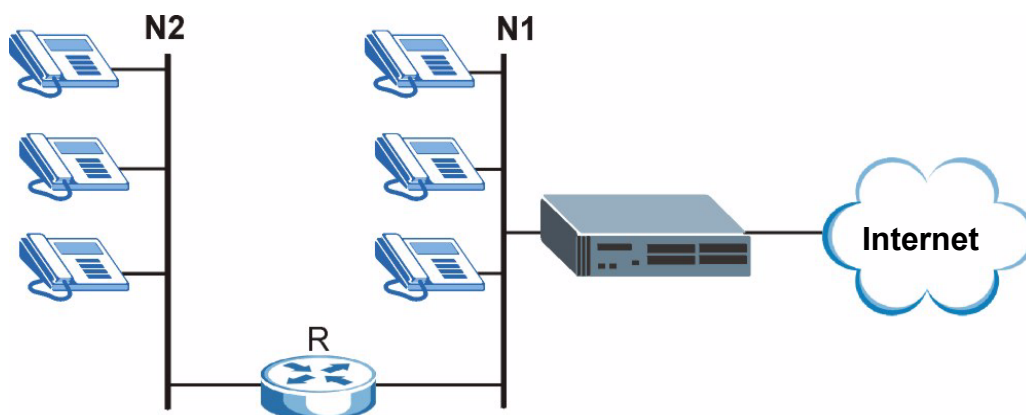
LABEL	DESCRIPTION
Current Time and Date	This section displays the current date and time.
Time and Date Setup	
Manual	Select this if you want to specify the current date and time in the fields below.
New Time	Enter the new time in this field, and click Apply .
New Date	Enter the new date in this field, and click Apply .
Get from Time Server	Select this if you want to use a time server to update the current date and time in the X6004.
Time Server Address 1/2	Enter the IP address or URL of your time server. Check with your ISP or network administrator if you are unsure of this information.
Time Zone Setup	
Time Zone	Select the time zone at your location.
Enable Daylight saving	Select this if your location uses daylight savings time. Daylight savings is a period from late spring to early fall when many places set their clocks ahead of normal local time by one hour to give more daytime light in the evening.
Start Date	Enter which hour on which day of which week of which month daylight-savings time starts.

Table 15 Configuration > Network > NTP

LABEL	DESCRIPTION
End Date	Enter which hour on which day of which week of which month daylight-savings time ends.
Offset	Enter the amount of time (in hours) by which to adjust the time during daylight saving period.
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

6.6 Static Route Overview

In a subnetted LAN environment the X6004 is typically connected to a router. The router specifies the subnet to which the X6004 is directly connected and the X6004 has no knowledge of the subnets beyond. For instance, the X6004 knows about the IP phones in subnet N1 in the following figure. However, the X6004 is unable to route a packet to phones in subnet N2 because it doesn't know that there is a route through Router 1 (R). Static routes tell the X6004 about the subnets beyond the router its directly connected to.

Figure 79 Example of Static Routing Topology

6.6.1 Configuring Static Route

Use this screen to look at static routes in the X6004. Click **Configuration > Network > Static Route** to open the **Static Route** screen.

Figure 80 Configuration > Network > Static Route

Static Route				
	Destination Network	Subnet Mask	Gateway IP	Network Interface
<input type="checkbox"/>	192.168.5.0	255.255.255.0	192.168.1.254	LAN

The following table describes the labels in this screen.

Table 16 Configuration > Network > Static Route

LABEL	DESCRIPTION
Delete	Select this checkbox and click Delete to remove this static route from the X6004.
Destination Network	This parameter specifies the IP network address of the final destination. Routing is always based on network number.
Subnet Mask	This is the subnet mask of the static route.
Gateway IP	This is the IP address of the gateway. The gateway is a router or switch on the same network segment as the device's LAN port. The gateway helps forward packets to their destinations.
Network Interface	This field specifies the interface of the static route.
Add/Delete	Use the Add and Delete icons to create or remove static routes respectively.

6.6.2 Add a Static Route

Click the **Add** icon in the **Configuration > Network > Static Route** screen. The screen shown next appears. Use this screen to configure the required information for a static route.

Figure 81 Configuration > Network > Static Route > Add

The following table describes the labels in this screen.

Table 17 Configuration > Network > Static Route > Add

LABEL	DESCRIPTION
Add a New Static Route	
Destination Network	This parameter specifies the IP network address of the final destination. Routing is always based on network number.
Subnet Mask	Select the IP subnet mask.
Gateway IP	Enter the IP address of the gateway. The gateway is a router or switch on the same network segment as the device's LAN port. The gateway helps forward packets to their destinations.
Network Interface	This is a read-only field indicating that this static route is configured for the LAN.
Apply	Click Apply to save your changes back to the X6004.
Cancel	Click Cancel to begin configuring this screen afresh.

PART III

IP PBX

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[Auto Provision \(103\)](#)
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[LCR \(185\)](#)
[Group Management \(191\)](#)
[Call Services \(197\)](#)
[ZyStack \(207\)](#)

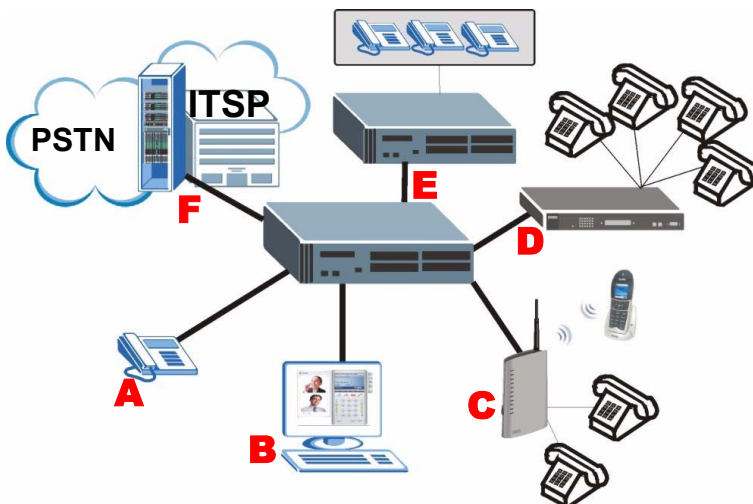
SIP Server

This chapter shows you how to set up your SIP server settings on the X6004. It also covers parameters for FXO/FXS channels, call blocking settings and feature codes.

7.1 SIP Server Overview

The following diagram shows SIP devices communicating with the X6004. In SIP some devices act as clients and others as servers. For example, in the figure below, devices **A-D** act as clients and must register with the X6004 before they are able to make calls via the X6004. The X6004 also is a client in relation to the SIP server located at the ITSP(**F**). The X6004 must register with the ITSP SIP server before calls can be routed to telephones outside its network. Finally, two SIP servers can act as peers, as shown with another X6004 (**E**) in the figure below. In this case, both X6004s must register with each other before they can forward each other's calls.

Figure 82 SIP Devices and the X6004



7.1.1 RTP

When you make a VoIP call using SIP, the RTP (Real Time Transport Protocol) is used to handle voice data transfer. See RFC 1889 for details on RTP.

7.2 SIP Server Global Settings

Use this screen to set up the SIP server settings on the X6004. SIP clients, such as the IP phones on your network, must enter this information when registering with the X6004. To access this screen, click **Configuration > PBX > Server Configuration > SIP Server**.

Figure 83 Configuration > PBX > Server Configuration > SIP Server > Global Set

The screenshot shows the 'Global' tab selected in the 'Configuration > PBX > Server Configuration > SIP Server' menu. The 'IP-PBX Global setting' section contains the following fields and options:

- SIP Server Realm Name:** A text box containing 'default'.
- Port:** A text box containing '5060'.
- Default SIP Client Registration Expiration:** A text box containing '60' with a note '(1~86400)Sec.'.
- RTP Port Range:** Two text boxes containing '10000' and '20000' separated by a tilde '~'.
- Default Ring Time:** A text box containing '20' with a note '(1~300)Sec.'.
- Codec G723.1:** Radio buttons for 'Disable' (selected) and 'Enable'.

'Apply' and 'Reset' buttons are located at the bottom right of the form.

Each field is described in the following table.

Table 18 Configuration > PBX > Server Configuration > SIP Server > Global Set

LABEL	DESCRIPTION
SIP Server Realm Name:	A realm is a set of usernames and passwords used by SIP client devices to authenticate with a SIP server. The X6004 supports a single realm. When SIP clients register with the X6004, they must provide the name of the realm they belong to as well as the username and password. Type the realm name which the extensions that register with the X6004 must provide for authentication.
Port:	Enter the X6004's listening port number or keep the default value. This is the port number your SIP clients need to use to register with the X6004.
Default SIP Client Registration Expiration	<p>The X6004 is a SIP registrar server. A SIP registrar server maintains a database of SIP identity-to-IP address (or domain name) mapping. The X6004 checks your username, password and realm when you register.</p> <p>Enter the number of seconds SIP clients are registered with the X6004 before their registration record is deleted. SIP clients should be configured to automatically try to re-register with the X6004.</p> <p>Make sure that the client SIP devices are configured to re-register at an interval smaller than the time set in this field.</p>
RTP Port Range	<p>When you make a VoIP call using SIP, the RTP (Real time Transport Protocol) is used to handle voice data transfer.</p> <p>Enter the listening port number(s) for RTP traffic or keep the default values. Enter the port number at the beginning of the range in the first field and enter the port number at the end of the range in the second field.</p>
Default Ring Time	Specify for how many seconds the X6004 sends a ringing tone to client devices for incoming calls.
Codec G723.1	<p>Select Enable to turn on support for G723.1 voice codec or select Disable to turn off support for the G723.1 voice codec.</p> <p>Note: This setting only takes affect after a system restart.</p>

Table 18 Configuration > PBX > Server Configuration > SIP Server > Global Set

LABEL	DESCRIPTION
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

7.3 FXO Channel

An FXO channel is a connection from the X6004 to a traditional PBX (for example a PSTN connection) via one of the FXO ports installed on the X6004. After you install the FXO interface card on the X6004 (see the Quick Start Guide), you must configure how the X6004 adjusts the signal volume sent to and received from a traditional PBX.

7.3.1 Configure FXO Settings

Use this screen to configure settings related to the FXO lines configured on the X6004. To access this screen, click **Configuration > PBX > Server Configuration > SIP Server > FXO**.

Figure 84 Configuration > PBX > Server Configuration > SIP Server > FXO

The screenshot shows the 'FXO Configuration' screen. At the top, there are tabs: 'Global', 'FXO' (which is highlighted), 'FXS', 'Call Block', and 'Feature Code'. Below the tabs, the title 'FXO Configuration' is displayed. The main area contains several configuration fields: 'FXO Configuration' (a label), 'Machine ID' (a dropdown menu showing 'IPPBX_001'), 'Slot' (a dropdown menu showing 'Slot_B'), 'Port' (a dropdown menu showing 'Port_3'), 'Speaking Volume' (a label), 'Level' (a dropdown menu showing '-2'), 'Listening Volume' (a label), 'Level' (a dropdown menu showing '-2'), 'Busy Detect' (a label), 'Count' (a dropdown menu showing '2'), 'Country Code' (a label), and 'Code' (a dropdown menu showing 'USA'). At the bottom of the form, there are two buttons: 'Apply' and 'Reset'.

Each field is described in the following table.

Table 19 Configuration > PBX > Server Configuration > SIP Server > FXO

LABEL	DESCRIPTION
FXO Configuration	Use these fields to specify the FXO interface which you want to configure.
Machine ID	Specify the X6004 for which you want to configure FXO settings. This field is only configurable if you have more than one X6004 working in a ZyStack.
Slot	Specify which FXO interface card you want to configure. The cards are identified by the extension card slot they are installed in. Select one of the slots or select All to make the settings the same for all FXO interface cards.
Port	Specify the FXO port on the FXO interface card you want to configure.
Speaking Volume	Select the volume level transmitted by the X6004 from the phones on your network via the specified FXO lines. -6 is the quietest, and 6 is the loudest.

Table 19 Configuration > PBX > Server Configuration > SIP Server > FXO

LABEL	DESCRIPTION
Listening Volume	Select the volume level transmitted by the X6004 to the phones on your network for calls via the FXO lines. -6 is the quietest, and 6 is the loudest.
Busy Detect	The X6004 listens for a tone to detect if an FXO line has been hung up. This tone differs by region and it may also differ slightly between carriers. In some cases the X6004 may mistake background noise for a busy line signal. This setting defines the number of busy tones the X6004 needs to recognize before actually considering the line to be busy. You should select a low value, if you have a good connection. Select a higher value, if your FXO connection is of lower quality to avoid false hang-ups.
Country Code	The signals used to indicate a busy line or an available line differ by country. You must select the country code for the location of the X6004. The X6004 can then recognize whether the FXO line is in use or available. Select default to reset the country code value to the factory defaults.
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

7.3.2 Configure FXS Settings

Use this screen to configure settings for the analog phones connected to the X6004. To access this screen, click **Configuration > PBX > Server Configuration > SIP Server > FXS**.

Figure 85 Configuration > PBX > Server Configuration > SIP Server > FXS

The screenshot shows the 'FXS Configuration' screen. At the top, there are tabs: 'Global', 'FXO', 'FXS' (highlighted), 'Call Block', and 'Feature Code'. Below the tabs, the title 'FXS Configuration' is displayed. The main area contains several configuration fields: 'Machine ID' with a dropdown menu showing 'IPPBX_001', 'Slot' with a dropdown menu showing 'Slot_A', and 'Port' with a dropdown menu showing 'Port_1'. Below these are four rows of settings: 'Speaking Volume' with 'Level' set to '2', 'Listening Volume' with 'Level' set to '-2', 'Dial Interval' with 'Sec.' set to '3', and 'Country Code' with 'Code' set to 'USA'. At the bottom of the screen, there are two buttons: 'Apply' and 'Reset'.

Each field is described in the following table.

Table 20 Configuration > PBX > Server Configuration > SIP Server > FXS

LABEL	DESCRIPTION
FXS Configuration	Use these fields to specify the FXS interface which you want to configure.
Machine ID	Specify the X6004 for which you want to configure FXS settings. This field is only configurable if you have more than one X6004 working in a ZyStack.
Slot	Specify which FXS interface card you want to configure. The cards are identified by the extension card slot they are installed in. Select one of the slots or select All to make the settings the same for all FXS interface cards.
Port	Specify the FXS port on the FXS interface card you want to configure.

Table 20 Configuration > PBX > Server Configuration > SIP Server > FXS

LABEL	DESCRIPTION
Speaking Volume	Select the volume level transmitted by the X6004 from the analog phones connected to the X6004. -6 is the quietest, and 6 is the loudest.
Listening Volume	Select the volume level sent by the X6004 to the analog phones connected to the X6004. -6 is the quietest, and 6 is the loudest.
Dial Interval	Enter the number of seconds the X6004 should wait after you stop dialing numbers (from FXS extensions) before it makes the phone call.
Country Code	The signals used by telephone companies to indicate a busy line or an available line differ by country. You must select the country code for the location of the X6004. The X6004 can then detect whether the FXS line is in use or available.
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

7.4 Call Blocking

Use this screen to have the X6004 not accept incoming calls from specific phone numbers or calls without caller ID. Click **Configuration > PBX > Server Configuration > SIP Server > Call Block** to view the screen as shown next.

Figure 86 Configuration > PBX > Server Configuration > SIP Server > Call Block

Each field is described in the following table.

Table 21 Configuration > PBX > Server Configuration > SIP Server > Call Block

LABEL	DESCRIPTION
Black list	Select Disable to turn call blocking off on the X6004. Select Enable to turn on call blocking on the X6004. Click Black list to configure the phone numbers you want to block from calling into the X6004. See Section 7.4.1 on page 99 .
Block the calls without Caller ID:	Select Disable to allow incoming calls without caller ID to be routed by the X6004. Select Enable to block calls without caller ID from being routed by the X6004.
Apply	Click this to save your changes.
Cancel	Click this to set every field in this screen to its last-saved value.

7.4.1 Call Blacklist

Use this screen to set up a list of phone numbers that are not allowed to call into the X6004.

You can also use the letters **N**, **Z** and **X** to represent numbers you want to block. The letter “**N**” represents any digit from 0-9, **Z** any digit from 1-9 and **X** any digit from 2-9. For example, enter **023NNNNNN** to block any 9 digit number that starts with **023** from calling the extensions configured on the X6004.

Furthermore, you can use the period (.) as a wildcard, to block any numbers that begin with a pattern of digits you specify. For example, enter **555.** to block any numbers starting with the string **555** from calling the extensions configured on the X6004.

To access this screen, click **Configuration > PBX > Server Configuration > SIP Server > Call Block(AA) > Black List**.

Figure 87 Configuration > PBX > Server Configuration > SIP Server > Call Block > Black List

Each field is described in the following table.

Table 22 Configuration > PBX > Server Configuration > SIP Server > Call Block > Black List

LABEL	DESCRIPTION
Number	Type the telephone number you want the X6004 to block from calling extensions in your telephone network. Click Add to place this number in the blacklist. You can also use the letters N , X and Z to represent numbers and the period “.” to include any number that starts with the digits you specify.
Delete	Highlight an existing telephone number in the blacklist and click the Delete icon to remove this telephone number from the blacklist.
Apply	Click this to save your changes.
Cancel	Click this to go back to the Call Block screen.

7.5 Setting Feature Codes

Use this screen to set values for the feature codes the X6004 supports. Users can dial these codes to enable or disable the features listed below by entering these codes on their phone’s keypad. Click **Configuration > PBX > Server Configuration > SIP Server > Feature Code** to open the screen as shown.

Figure 88 Configuration > PBX > Server Configuration > SIP Server > Feature Code

Global	FXO	FXS	Call Block	Feature Code	
Feature code setting					
Black List On		*67		Black List Off	*85
Block no ID On		*77		Block no ID Off	*87
Call Forward On		*72		Call Forward Off	*73
Call Forward IVR		*74		Call Forward Busy On	*90
Call Forward Busy Off		*91		Call Forward Busy IVR	*92
Call Forward No Answer On		*82		Call Forward No Answer Off	*83
Call Forward No Answer IVR		*84		Call Transfer	*96
Direct Pickup		*95		DND On	*78
DND Off		*79		DND IVR	*80
Follow Me On		*22		Follow Me Off	*23
Group Pickup		*94		Personal IVR	*
Voice Mail		**			
<input type="button" value="Apply"/> <input type="button" value="Reset"/>					

The following table describes the labels in this screen.

Table 23 Configuration > PBX > Server Configuration > SIP Server > Feature Code

LABEL	DESCRIPTION
Feature code setting	The codes you enter are dialed by individuals to manage the features listed below for their extension.
Black List On	Enter the code used to enable call blocking for numbers on the personal blacklist of an extension.
Black List Off	Enter the code used to disable call blocking for numbers on the personal blacklist of an extension.
Block no ID On	Enter the code used to enable call blocking for calls without a caller ID.
Block no ID Off	Enter the code used to disable call blocking for calls without a caller ID.
Call Forward On	Enter the code used to enable call forwarding.
Call Forward Off	Enter the code used to disable call forwarding.
Call Forward IVR	Enter the code used to edit call forwarding settings.
Call Forward Busy On	Enter the code used to enable call forwarding when an extension is busy.
Call Forward Busy Off	Enter the code used to disable call forwarding when an extension is busy.
Call Forward Busy IVR	Enter the code used to edit call forwarding settings when an extension is busy.
Call Forward No Answer On	Enter the code used to enable call forwarding when there is no answer at an extension.
Call Forward No Answer Off	Enter the code used to disable call forwarding when there is no answer at an extension.
Call Forward No Answer IVR	Enter the code used to edit call forwarding settings when there is no answer at an extension.
Call Transfer	Enter the code used to transfer calls.

Table 23 Configuration > PBX > Server Configuration > SIP Server > Feature Code

LABEL	DESCRIPTION
Direct Pickup	Enter the code used to pick up calls for your extension from a different extension.
DND On	Enter the code used to turn the Do Not Disturb feature on for this extension.
DND Off	Enter the code used to turn the Do Not Disturb feature off for this extension.
DND IVR	Enter the code used to edit Do Not Disturb settings at an extension.
Follow Me On	Enter the code used to turn the Follow Me feature on for this extension.
Follow Me Off	Enter the code used to turn the Follow Me feature off for this extension.
Group Pickup	Enter the code used to activate group pickup for this extension.
Personal IVR	Enter the code used to edit personal configuration for an extension via the handset.
Voice Mail	Enter the code used to access voice mail on the X6004.
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

Auto Provision

This chapter shows you how to set up auto provisioning for the SIP clients of the X6004.

8.1 Auto Provisioning Overview

Auto provisioning allows administrators to configure VoIP related settings on ZyXEL's SIP clients from a central location. You can set up and maintain a configuration file associated with a SIP extension on the X6004. Auto provisioning has the VoIP devices periodically download the configuration file from the X6004.



Check the documentation that came with your ZyXEL softphone, IP phone, ATA or other device to see if it supports auto provisioning.

The configuration file contains the settings you configure for a specific telephone extension in your organization. It also contains SIP settings necessary for the device to register with the X6004. The configuration file is encrypted using 3DES (Triple Data Encryption Standard). See [Chapter 14 on page 125](#) for more information on extensions and [Chapter 7 on page 95](#) for more information on SIP settings.

8.1.1 How to Configure Auto Provisioning

Take the following steps to configure auto provisioning for the VoIP devices on your network. See also [Chapter 3 on page 41](#) for an auto provisioning tutorial.

- 1 Configure extensions that you want to assign to VoIP devices on your network. See [Chapter 14 on page 125](#).
- 2 Create an SPTGEN file (this is a configuration file that can be downloaded by ZyXEL devices that support SPTGEN). Use the **Auto Provision** screen, described in [Section 8.2 on page 104](#), to create this file. You will need one of the following: the MAC address of the IP phone or ATA or the serial number associated with a ZyXEL softphone. This information is used to uniquely identify the device that you want to assign an extension to.
- 3 Configure the auto provisioning compliant ZyXEL device (or softphone) to receive configuration information from the X6004. This typically involves specifying the protocol used for auto provisioning. At the time of writing, you can use HTTP protocol

for auto provisioning with the X6004. See the documentation that came with your ZyXEL device for information on how to do this.

8.1.2 How Auto Provisioning Works

When a ZyXEL device is configured for auto provisioning, it attempts to find an auto provisioning server on its network. ZyXEL devices use Simple Service Discovery Protocol (SSDP) to find the IP address of an auto provisioning server (for example the X6004). This process is referred to as auto discovery. Some ZyXEL devices allow you to enter the IP address of the auto provisioning server.



The auto discovery process is limited to your LAN.

Once a ZyXEL VoIP device finds the X6004, it sends an HTTP request for a configuration file. The X6004 checks to see if it has a configuration file associated with the serial number or MAC address of the ZyXEL device requesting the configuration file. If the X6004 has the configuration file, then it sends the configuration file to the ZyXEL VoIP device.

8.2 Auto Provision Screen

If an auto provision file has been configured for a SIP extension, this screen displays the mapping between a SIP extension and a ZyXEL VoIP device's MAC address or serial number. To access this screen, click **Configuration > PBX > Server Configuration > Auto Provision**.

Figure 89 Configuration > PBX > Server Configuration > Auto Provision

Auto Provision					
Configuration					
:Edit :Advanced					
Phone Numbers	MAC Address	Serial No.	SPTGEN File Exist	Edit	View SPTGEN
1001			No		
1002			No		
1003			No		
1004			No		
1005			No		
1006			No		
1007			No		
1008			No		
1009			No		
1010			No		

Each field is described in the following table.

Table 24 Configuration > PBX > Server Configuration > Auto Provision

LABEL	DESCRIPTION
Configuration	
Phone Numbers	This field displays the extension number configured on the X6004.
MAC Address	This field displays the MAC address of the ZyXEL device specified to receive configuration settings from the X6004. This field is blank for extensions assigned to software based IP phones.
Serial No.	This field displays the serial number of the software based IP phone specified to receive configuration settings from the X6004. This field is blank for extensions assigned to hardware based IP phones.
SPTGEN File Exist	This field displays Yes , if a configuration file (SPTGEN file) has been created. It displays No , if an SPTGEN file has not been created.
Edit	Click the Edit icon to create a configuration file and associate it with a ZyXEL device on your network. The Auto Provision Settings screen opens.
View SPTGEN	Click the Advanced icon to view the settings in the configuration file.

8.2.1 Auto Provision Edit Settings

Use this screen to set up the auto provisioning settings for an extension on the X6004 and associate it with a ZyXEL device on your network. To access this screen, click **Configuration > PBX > Server Configuration > Auto Provision > Edit**.

Figure 90 Configuration > PBX > Server Configuration > Auto Provision > Edit

Each field is described in the following table.

Table 25 Configuration > PBX > Server Configuration > Auto Provision > Edit

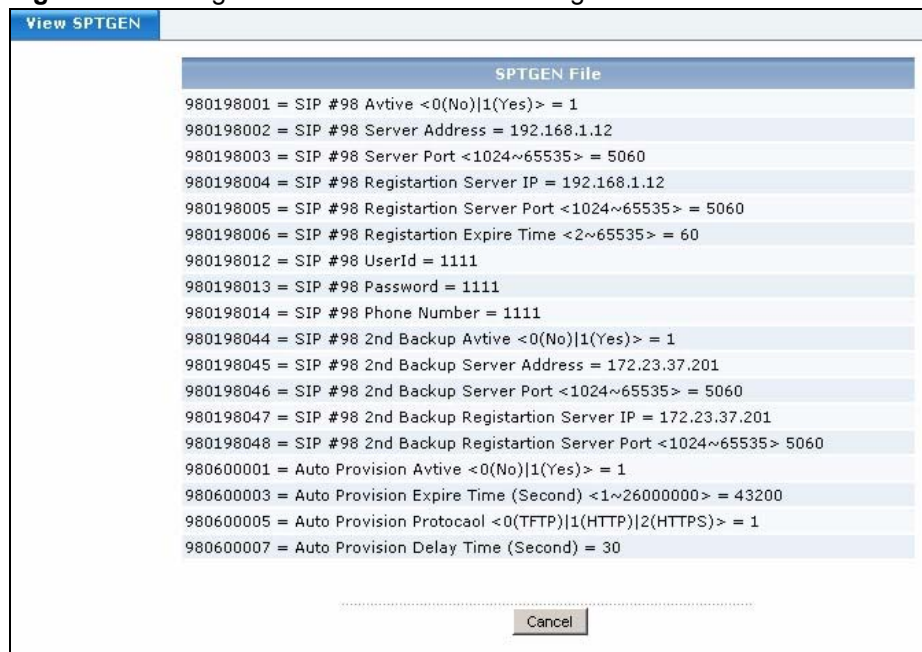
LABEL	DESCRIPTION
Provisioning Setting	These settings apply to the phone number (extension) you specified in the Auto Provision screen.
MAC Address	Specify the MAC address of the ZyXEL device that receives configuration settings from the X6004 for this extension. This field is left blank for extensions assigned to software based IP phones.
Serial No.	Specify the serial number of the software based IP phone that receives configuration settings from the X6004 for this extension. This field is left blank for extensions assigned to hardware based IP phones.

Table 25 Configuration > PBX > Server Configuration > Auto Provision > Edit

LABEL	DESCRIPTION
Auto Provision Active	Choose On , if you want to activate auto provisioning for this extension or choose Off if you want to deactivate auto provisioning for this extension.
Auto Provision Interval Time	Specify the amount of time in seconds that the X6004 waits between sending configuration settings to the ZyXEL device.
Auto Provision Delay Time	Specify the time the X6004 waits before sending a configuration file to a ZyXEL device that requested it. The delay time is used by the X6004 to space out sending auto provisioning files to multiple clients which request auto provisioning files at the same time.
ATA device	Select this if the ZyXEL device to which you are sending this configuration file is an ATA device. An ATA (Analog Telephone Adapter) device typically has multiple analog telephones connected to it and can have unique configuration files for each port that it supports.
Port No.	Specify the ATA's phone port number that you want to create this configuration file for.
Set Profile	Click Set Profile to create the configuration file and return to the Auto Provision screen.
Cancel	Click Cancel to go back to the Auto Provision screen without saving any changes.

8.2.2 Auto Provision View SPTGEN

Use this screen to view the configuration file (SPTGEN) file for a specific extension. To access this screen, click **Configuration > PBX > Server Configuration > Auto Provision** and click the **Advanced** icon next to the extension for which you want to view the SPTGEN file.

Figure 91 Configuration > PBX > Server Configuration > Auto Provision > Advanced

The SPTGEN file displays the configuration settings sent from the X6004 to a ZyXEL device configured for auto provisioning. Click **Return** to go back to the **Auto Provision** screen.

This chapter shows you how to configure Quality of Service (QoS) settings on the X6004.

9.1 QoS Overview

Quality of Service (QoS) refers to both a network's ability to deliver data with minimum delay, and the networking methods used to control the use of bandwidth. Without QoS, all traffic data is equally likely to be dropped when the network is congested. This can cause a reduction in network performance and make the network inadequate for time-critical applications such as VoIP.

The following problems can occur on a congested network with poor QoS settings:

- **Latency** - delay of packet delivery. This can cause echoes during a conversation.
- **Jitter** - variations in delay of packet delivery. This could cause strange sound effects. The X6004 utilizes a jitter buffer to minimize the effects of jitter.
- **Packet Loss** - packets are dropped due to an overwhelming amount of traffic on the network. Some degree of packet loss will not be noticeable to the end user, but as packet loss increases the quality of sound degrades.

The X6004 can be configured to change the priority field of IP packets for all outgoing RTP (Real Time Protocol) packets. The X6004 supports Type of Service (ToS) and Differentiated Services (Diffserv) for implementing QoS. Configure the X6004 with the QoS settings that your network uses for VoIP.

9.1.1 ToS

The X6004 supports the following classes of service for outgoing VoIP packets.

- **Minimize Delay** - Use this when the time it takes for a packet to travel from the source host to destination host (latency) is most important.
- **Maximize Throughput** - Use this when the volume of data transmitted in any period of time is important.
- **Maximize Reliability** - Use this when it is important that you have some certainty that the data will arrive at the destination without retransmission being required.
- **Minimize Cost** - Use this when it is important to minimize the cost of data transmission. Network providers may offer two types of service (for example fiber and copper) and charge differently depending on which you use. In this case, choosing “minimize cost” may inform the network provider to use the lower cost route to send your VoIP traffic.



It is recommended to use the **Minimize Delay** class for VoIP traffic.

9.1.2 DiffServ

DiffServ (Differentiated Services) is a class of service (CoS) model that marks packets (based on the application types and traffic flow) so that they receive specific per-hop treatment at DiffServ-compliant network devices along their route. Packets are marked with DiffServ Code Points (DSCPs) indicating the level of service desired. This allows the intermediary DiffServ-compliant network devices to handle the packets differently depending on the code points without the need to negotiate paths or remember state information for every flow. In addition, applications do not have to request a particular service or give advanced notice of where the traffic is going.

9.1.3 DSCP and Per-Hop Behavior

The DSCP value determines the forwarding behavior, the PHB (Per-Hop Behavior), that each packet gets across the DiffServ network. Based on the marking rule, different kinds of traffic can be marked for different forwarding treatment. Resources can then be allocated according to the DSCP values and the configured policies.

The X6004 allows you to mark outgoing frames with following PHB classifications:

Assured Forwarding (AF) - This is a PHB group allowing you to choose from one of four classes of forwarding assurance. Each class has three choices of drop precedence to choose from. When congestion occurs, the DS nodes on your network treat all IP packets marked with the same class and drop precedence identically. DS nodes can be configured to protect packets with lower drop precedence value by discarding packets with a higher drop precedence value.

Expedited Forwarding (EF) - The EF PHB defines a single DSCP designed for simulating a private end-to-end pipeline across a DiffServ network. IP packets are marked for high priority low-loss, low-latency, low-jitter, assured-bandwidth end to end service through DS domains. This is recommended for use with VoIP traffic as it addresses the factors that cause degradation in sound quality.

Class Selector (CS) - IP packets are marked with values partially backwards compatible with known current uses of IP precedence field. The packets marked with higher values are given higher priority than those with lower values.

9.2 QoS Settings

Use this screen to set up the QoS settings on the X6004. To access this screen, click **Configuration > PBX > Server Configuration > QoS**.

Figure 92 Configuration > PBX > Server Configuration > QoS

Each field is described in the following table.

Table 26 Configuration > PBX > Server Configuration > QoS

LABEL	DESCRIPTION
QoS	Select the QoS method you want to use to mark outgoing frames on the X6004. You can choose: <ul style="list-style-type: none"> • TOS and then select one of the four classes of service supported on the X6004: minimize delay, maximize throughput, maximize reliability or minimize cost. • DS (DiffServ) and then select the DSCP value to mark the outgoing packets. You can choose: one of the AF (Assured Forwarding), EF (Expedited Forwarding) or one of the CS (Class Selector) values. • User Define and then enter a value to assign to the ToS field in decimal notation. You can set the value to a value from 0 to 255. The X6004 displays the value you enter in hexadecimal notation. • None, if you do not want to mark the ToS field of the outgoing VoIP packets.
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

Voice Mail

This chapter shows you how to set up auto provisioning for the SIP clients of the X6004.

10.1 Voice Mail Overview

Voice mail messages on the X6004 are stored on the built-in flash memory of the X6004. To ensure that one user does not utilize a disproportionate amount of voice mail capacity, you can limit the voice mail resources on a per user basis.



Another way to manage your voice mail messages is to forward them to email accounts associated with each telephone extension on the X6004. See [Chapter 14 on page 125](#) for information on how to configure email forwarding of voice mail messages.

10.1.1 Mail Relay

A mail relay is a simple mail server that accepts e-mails, filters them based on pre-defined criteria and forwards them to another server. A mail relay adds another security layer in your organization.

If your organization uses a mail relay and you are implementing the forwarding of voice messages to email accounts, then you must configure mail relay settings on the X6004.

10.2 Voice Mail Screen

Use this screen to set up the voice mail settings on the X6004. To access this screen, click **Configuration > PBX > Server Configuration > Voice Mail**.

Figure 93 Configuration > PBX > Server Configuration > Voice Mail

Voice Mail

Voice Mail Management

Per call Max Length: seconds

Per user Max Usage: seconds

Mail Relay (Domain/IP):

Mail Relay (Port):

Each field is described in the following table.

Table 27 Configuration > PBX > Server Configuration > Voice Mail

LABEL	DESCRIPTION
Voice Mail Management	
Per call Max Length	Specify the maximum number of seconds for each voice mail message. This value can be from 1 to 90 seconds.
Per user Max Usage	Specify the maximum number of seconds for all voice mail messages for each extension. When a user hits this limit then the X6004 will no longer save voice mail messages. This value can be from 1 to 300 seconds.
Mail Relay (Domain/IP)	Specify the domain name or IP address of the mail relay server to which you want to send voice mail messages.
Mail Relay (Port)	Specify the listening port number of the mail relay server to which you want to send voice mail messages.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to set every field in this screen to its last-saved value.

Phonebook

This chapter shows you how to set up a phonebook for the X6004.

11.1 Phonebook Overview

There are two ways to set up a phone book on the X6004. You can create an LDAP (Lightweight Directory Access Protocol) phonebook, which imports entries from an LDAP directory on your network. You can also create local phonebook entries via the web configurator of the X6004. The entries in the phonebook are available to users on your network via the personal web portal of the X6004 (see [Chapter 32 on page 265](#) for more information on the web portal). You can configure either type of phonebook, or both. If you configure both phonebooks, then the entries from both phonebooks (duplicate entries included) are displayed to the end users.

11.1.1 LDAP Based Phonebook

LDAP directories are commonly used to store user based information within an organization. For example, email clients such as Outlook use LDAP to query address book entries from an LDAP directory. The X6004 is capable of sending LDAP queries to an LDAP server to create and keep up to date the phone book entries on the X6004.

You need the following information about the LDAP server on your network to issue an LDAP query from the X6004:

- LDAP Server IP address - this is the IP address of the LDAP server you want to query.
- Port number - this is the port number that the LDAP user to receive LDAP queries.
- RootDN - this is the username used to authenticate with the LDAP server. This information is configured on the LDAP server. Refer to your LDAP server documentation.
- Password - this is the password used to authenticate with the LDAP server.
- BaseDN - this string identifies the location on the LDAP server where the phone book information is stored. LDAP directories are divided into subdirectories and you need to enter the right subdirectory in order to search for the information for your phonebook.
- The names of the fields on the LDAP database that you want to obtain information from. Each record on the LDAP database contains many fields and you need to provide the correct field names in order to obtain the data.

11.1.2 Local Phonebook

The local phonebook on the X6004 can be created by adding phonebook entries via the web configurator. You can also export the local phonebook into a text file. The text file can be edited and imported back to the X6004 via the web configurator.

11.2 Phonebook Configuration Screen

Use this screen to set up a connection to an LDAP server on the X6004 and to either import or export your local phonebook. To access this screen, click **Configuration > PBX > Server Configuration > Phonebook**.

Figure 94 Configuration > PBX > Server Configuration > Phonebook

The screenshot shows the 'Phonebook Configuration' screen with three tabs: 'Phonebook Config', 'LDAP Phonebook', and 'Local Phonebook'. The 'LDAP Phonebook' tab is active, displaying the 'LDAP Phonebook Configure' section. This section includes a 'LDAP Enable' checkbox (unchecked) and input fields for 'LDAP Server', 'LDAP Port', 'RootDN', 'Password', and 'BaseDN'. An 'Apply' button is located below these fields. Below the 'LDAP Phonebook Configure' section is the 'Local Phonebook Export/Import' section, which contains an 'Export phonebook file:' label with an 'Export' button, and an 'Import phonebook file:' label with a text input field, a 'Browse...' button, and an 'Import' button.

Each field is described in the following table.

Table 28 Configuration > PBX > Server Configuration > Phonebook

LABEL	DESCRIPTION
LDAP Phonebook Configure	Use this section to configure your connection settings to the LDAP database containing the phonebook entries you want to import to the X6004.
LDAP Enable	Check this box to enable LDAP based phonebook on the X6004.
LDAP Server	Specify the IP address of the server containing the LDAP database.
LDAP Port	Specify the port the LDAP server uses for sending the phonebook to the X6004.
RootDN	Specify the login name of the LDAP server.
Password	Specify the password for the LDAP server.
BaseDN	Enter the string identifying the location on the LDAP server where the information you need for your phonebook is stored.
Apply	Click this to import the phonebook information from the LDAP server.
Local Phonebook Export/Import	Use this section to download the local phonebook from the X6004 to your local computer or another location on your network or to upload a text file containing your phonebook entries to the X6004.

Table 28 Configuration > PBX > Server Configuration > Phonebook

LABEL	DESCRIPTION
Export phonebook file	Click Export to save your local phonebook to your local computer or another location on your network. A screen appears prompting you for a location to download your phonebook file.
Import phonebook file	Type the path to or click Browse and locate the text file containing a local phonebook. Then click Import to upload the phonebook file to the X6004. The X6004 displays the Import Phonebook screen, which allows you to review the local phonebook entries before saving them to the X6004.

11.2.1 Import Phonebook Screen

The following screen appears after you click **Import** in the **Phonebook Config** screen.

Figure 95 Import Phonebook Screen

The screenshot shows the 'Import Phonebook' screen. At the top, there is a header bar with the title 'Import Phonebook'. Below this, there is a sub-header 'Import Phonebook' followed by a table of phonebook entries. The table has eight columns: name, ext., home, mobile, e-mail, logon name, country, and department. There are two rows of data. Below the table, there are 'Apply' and 'Cancel' buttons.

name	ext.	home	mobile	e-mail	logon name	country	department
Test	4444	5555555	0955555555	test@test.com	test	USA	sales
Tomasz H	5000	12-2233344	098887878787	thasinski@yahoo.com	Tomasz H	United	R

Apply Cancel

Review the phonebook entries and click **Apply** to save this phonebook to the X6004. This overrides any previously stored local phonebook entries. Click **Cancel** if you don't want to save this phonebook to the X6004. See [Section 11.3.1 on page 117](#) for information on the individual fields in the local phonebook entries.

11.3 LDAP Phonebook Screen

Use this screen to map the values associated with the account entries on the LDAP server to the phonebook values stored on the X6004. You can also view the LDAP phonebook entries and configure how often the X6004 updates the LDAP phonebook from the LDAP server. To access this screen, click **Configuration > PBX > Server Configuration > Phonebook > LDAP Phonebook**.

Figure 96 Configuration > PBX > Server Configuration > Phonebook > LDAP Phonebook

Phonebook Config		LDAP Phonebook		Local Phonebook	
name	displayName	ext.	telephoneNumber		
e-mail	mail	country	c		
logon name	userPrincipalName	home	homePhone	Modify	
mobile	mobile	department	department	Default	

name	ext.	home	mobile	e-mail	logon name	country	department
Latest Update: Fri, 29 Sep 2006 13:25:53 +0800							

☐ Regular update at 0 : 0 everyday **Set**

Refresh

Each field is described in the following table.

Table 29 Configuration > PBX > Server Configuration > Phonebook > LDAP Phonebook

LABEL	DESCRIPTION
name	Specify the field name in the LDAP database that you want to map the name field of the LDAP phonebook to.
e-mail	Specify the field name in the LDAP database that you want to map the e-mail field of the LDAP phonebook to.
logon name	Specify the field name in the LDAP database that you want to map the logon name field of the LDAP phonebook to.
mobile	Specify the field name in the LDAP database that you want to map the mobile field of the LDAP phonebook to.
ext.	Specify the field name in the LDAP database that you want to map the ext. field of the LDAP phonebook to.
country	Specify the field name in the LDAP database that you want to map the country field of the LDAP phonebook to.
home	Specify the field name in the LDAP database that you want to map the home field of the LDAP phonebook to.
department	Specify the field name in the LDAP database that you want to map the department field of the LDAP phonebook to.
Modify	Click Modify to save any changes you made to the mappings of the fields on the LDAP phonebook to the LDAP database.
Default	Click Default to set every field in this screen to the factory defaults configured on the X6004. Note: This not only sets the fields to default values but also automatically saves the default mappings to the X6004.
name .. department	This table displays the phonebook entries retrieved from the LDAP database.
Regular update at	Select this and specify the time in hour and minute format at which the X6004 should update the LDAP phonebook with the LDAP database. Click Set to save this setting.
Refresh	Click Refresh to immediately update the LDAP phonebook with the LDAP database.

11.3.1 Local Phonebook Screen

Use this screen to set up the local phonebook settings on the X6004. To access this screen, click **Configuration > PBX > Server Configuration > Phonebook**.

Figure 97 Configuration > PBX > Server Configuration > Phonebook > Local Phonebook

Each field is described in the following table.

Table 30 Configuration > PBX > Server Configuration > Phonebook > Local Phonebook

LABEL	DESCRIPTION
Local Phonebook	This screen allows you to view, edit and remove local phonebook entries on the X6004.
Delete	Select the Delete checkbox and click Delete to remove a local phonebook entry from the X6004.
name	This field displays the name field value of the local phonebook entry.
ext.	This field displays the ext. field value of the local phonebook entry.
home	This field displays the home field value of the local phonebook entry.
mobile	This field displays the mobile field value of the local phonebook entry.
e-mail	This field displays the e-mail field value of the local phonebook entry.
logon name	This field displays the logon name field value of the local phonebook entry.
country	This field displays the country field value of the local phonebook entry.
department	This field displays the department field value of the local phonebook entry.
Add / Edit / Delete	Click the Add icon to configure a new entry in the local phonebook. Click the Edit icon to change the values of an existing local phonebook entry. Click the Delete icon to remove an entry from the local phonebook.

11.3.2 Local Phonebook Add/Edit Screen

The screens for editing or adding entries to the local phonebook contain the same fields. Only the screen used to add local phonebook entries is shown below. Use this screen to configure phonebook entries on the X6004. Click the **Add** (or **Edit**) icon in the **Local Phonebook** screen to view the screen as shown.



Only the **Add Local Phonebook** screen is shown. In the **Edit Local Phonebook** screen, some of the fields are read-only.

Figure 98 Local Phonebook Add/Edit Screen

Each field is described in the following table.

Table 31 Local Phonebook Add/Edit Screen

LABEL	DESCRIPTION
New/Edit PBX Phonebook	Use these fields to add (or edit) local phonebook entries. Note: You must fill in the name field in order to save this local phonebook entry. All the other fields can be left blank.
name	Type a name value for this local phonebook entry. This field is limited to 20 alphanumeric (a-z, A-Z, 0-9) characters. Spaces and dashes are also allowed. You cannot change this value if you are editing an existing local phonebook entry.
ext.	Type a ext. value for this local phonebook entry. This field is limited to 20 numeric characters (0-9).
home	Type a home value for this local phonebook entry. This field is limited to 20 numeric characters (0-9).
mobile	Type a mobile value for this local phonebook entry. This field is limited to 20 numeric characters (0-9).
e-mail	Type a e-mail value for this local phonebook entry. This field is limited to 127 printable ASCII characters, spaces are allowed but “=” and “+” is not.
logon name	Type a logon name value for this local phonebook entry. This field is limited to 127 printable ASCII characters, spaces are allowed but “=” is not.
country	Type a country value for this local phonebook entry. This field is limited to 127 printable ASCII characters, spaces are allowed but “=” is not.
department	Type a department value for this local phonebook entry. This field is limited to 127 printable ASCII characters, spaces are allowed but “=” is not.
Apply	Click Apply to save your settings.
Cancel	Click Cancel to return to the Local Phonebook screen without saving your changes.

DSP Management

This chapter shows you how to install additional Digital Signal Processing (DSP) modules in the X6004 and how to manage the DSP resources on the X6004.

12.1 DSP Overview

The X6004 uses Digital Signal Processing (DSP) modules to convert analog audio to digital signals, and vice versa. DSP modules are classified by the number of channels they are capable of processing. A normal phone conversation takes up two channels, since the X6004 must encode the outgoing analog audio while simultaneously decoding the incoming digital audio.

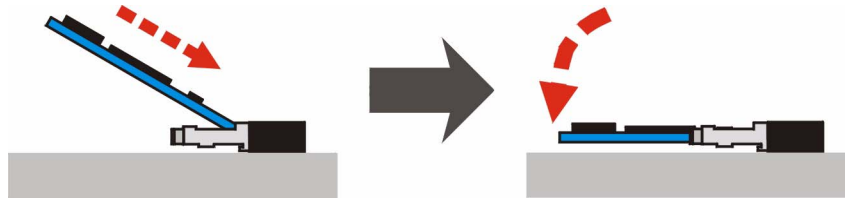
The X6004 contains an onboard DSP module, it is also equipped with a single removable DSP module by default. You can upgrade the existing DSP module with one that can process more channels. You can also install a second module to increase the number of calls the X6004 can handle simultaneously. See the product specification in [Appendix on page 283](#) for details about the DSP modules on the X6004.

This chapter shows you how to install and uninstall the DSP modules on the X6004. It also discusses how to manage the DSP resources on the X6004.

12.1.1 Installing a Second DSP Module

Take the following steps to install a second Digital Signal Processor in your X6004.

- 1 Ensure the power is off and all cables are disconnected. Lay the X6004 upside down on a flat, dry surface. The DSP hatch is located on the base of the X6004.
- 2 Unscrew and remove the DSP hatch screw.
- 3 Remove the DSP hatch cover.
- 4 Insert the DSP module's contacts into the connector socket at an angle, as shown in the figure.
- 5 Gently press the DSP module downwards, until the two retaining arms click into place. Replace the hatch cover and the screw.

Figure 99 Installing a DSP module

12.1.2 Removing a DSP Module

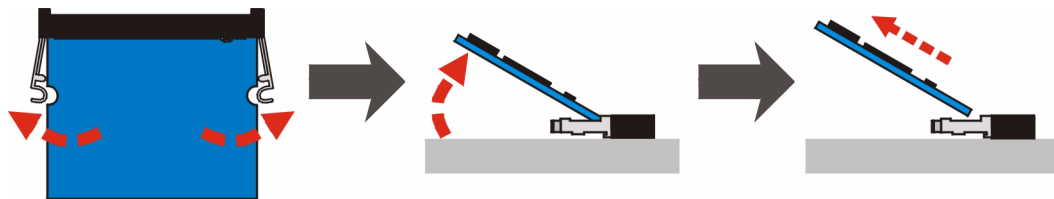
Take the following steps to remove a DSP module from the X6004.

- 1 Ensure the power is off and all cables are disconnected. Lay the X6004 upside down on a flat, dry surface. The DSP hatch is located on the base of the X6004.
- 2 Unscrew and remove the DSP hatch retaining screw.
- 3 Remove the DSP hatch cover.
- 4 Gently press the retaining arms away from the module, as shown in the figure. When both retaining arms are disengaged from the module, the module springs up to its angled position.



DO NOT pull the DSP module up without first disengaging the retaining arms. This could damage the module or the connector on the X6004.

- 5 Remove the DSP module. Replace the hatch cover and the screw.

Figure 100 Removing a DSP Module

12.2 DSP Management

The X6004 automatically detects the number of DSP channels available for processing telephone conversations. The number of DSP channels is based on the DSP modules installed on the X6004. The X6004 automatically assigns DSP channels to service the analog phone connections (FXS ports) available on the X6004. It also automatically assigns DSP channels to the analog connections to the PSTN (FXO ports). The remaining DSP channels can be divided between the SIP connection via the X6004 and conference calls on the X6004.

Consider the following when making decisions on how to assign the DSP channels on the X6004:

- A typical conversation uses two channels.
- A conference call uses one channel per participant.
- Unassigned DSP channels are shared between conference calls and SIP connections.

12.2.1 DSP Management Screen

Use this screen to manage the DSP channels available on the X6004. To access this screen, click **Configuration > PBX > Server Configuration > DSP Management**.

Figure 101 Configuration > PBX > Server Configuration > DSP Management

Attributes	IPPBX_001	IPPBX_002	IPPBX_003	IPPBX_004	IPPBX_005
Total available	21	0	0	0	0
FXO	4	0	0	0	0
FXS	4	0	0	0	0
SIP trunk	0	0	0	0	0
Conference	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Share	13	0	0	0	0

Each field is described in the following table.

Table 32 Configuration > PBX > Server Configuration > DSP Management

LABEL	DESCRIPTION
Attributes	This column displays which features use the DSP channels on the X6004. If you have a ZyStack configured, each column identifies a single X6004 in the ZyStack.
Total available	The X6004 automatically detects the total available DSP channels available on the X6004 and displays them in this field. This value is based on the DSP modules you have installed on the X6004.
FXO	This field displays the total DSP channels assigned to the FXO ports on the X6004. The X6004 automatically assigns one DSP channel per FXO port on the X6004.
FXS	This field displays the total DSP channels assigned to the FXS ports on the X6004. The X6004 automatically assigns one DSP channel per FXS port on the X6004.
SIP trunk	This field displays the total DSP channels assigned to the SIP trunks (connections to external SIP servers, for example, your ITSP) on the X6004. The X6004 automatically assigns two DSP channels per SIP trunk on the X6004.
Conference	Specify the DSP channels you want to assign specifically for conference calls on the X6004.
Share	This field displays the unassigned DSP channels on the X6004. Unassigned DSP channels are shared between SIP phone clients and conference calls on the X6004.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to set every field in this screen to its last-saved value.

Office Hours

This chapter shows you how to set the office hours for the X6004.

13.1 Office Hours Overview

The office hours you specify on the X6004 are used by the auto-attendant feature to determine how the X6004 handles incoming calls. For example, when calls come into your organization during office hours you may want to allow them to enter any extension they wish to call. However, when calls come into your organization after office hours you may want to direct them all to a single extension (for example night clerk) or you may want to divert all incoming calls to voice mail.

See [Chapter 19 on page 175](#) for more information on configuring auto-attendant.

Individuals can also specify their own office hours to deal with calls differently during various parts of the work week. See [Section 14.3.4 on page 135](#) for more information.

13.2 Office Hour Screen

Use this screen to specify office hours for the X6004. To access this screen, click **Configuration > PBX > Server Configuration > Office Hour**.

Figure 102 Configuration > PBX > Server Configuration > Office Hour

Each field is described in the following table.

Table 33 Configuration > PBX > Server Configuration > Office Hour

LABEL	DESCRIPTION
Office Hours	Use this section to specify office hours on the X6004.
Days of Week	Check the days of the week which you want the X6004 to treat as working days.

Table 33 Configuration > PBX > Server Configuration > Office Hour

LABEL	DESCRIPTION
Time	Specify the time range during the working days that you want the X6004 to treat as working hours.
Apply	Click Apply to save your changes.
Default	Click this button to set every field in this screen to factory default configuration.

Authority Group

This chapter shows you how to create and manage SIP and FXS extensions on the X6004.

14.1 Extension Management Overview

The X6004 allows you to manage individual SIP and FXS extensions. Before extensions can be created, you need to create at least one authority group on the X6004. See the [How It Works](#) chapter on page 37 for an overall explanation of authority groups and extensions. This chapter focuses on how to create authority groups on the X6004. It also shows you how to configure settings for SIP and FXS extensions on the X6004.

Basically, you can think of an authority group as a set of extensions (SIP, FXS or both). You use an authority group to assign equal rights to the entire set of extensions. For example, if you create two authority groups, you can allow one group to make local calls and long distance calls and the second authority group to make local calls only.

Authority groups and extensions follow these guidelines:

- You have to create at least one authority group on the X6004.
- Each extension can only be a member of one authority group.
- SIP and FXS extensions are treated the same within an authority group.

The following sections describe how to configure authority groups on the X6004. See [Section 14.3 on page 131](#) for more information on features related to individual extensions.

14.1.1 Voice Codecs

A codec (coder/decoder) codes analog voice signals into digital signals and decodes the digital signals back into voice signals. The following table describes the codecs supported on the X6004

Table 34 Voice Codecs Supported

CODEC	DESCRIPTION
G.711	<p>This is a Pulse Code Modulation (PCM) waveform codec. PCM measures analog signal amplitudes at regular time intervals (sampling) and converts them into digital bits (quantization). Quantization "reads" the analog signal and then "writes" it to the nearest digital value. For this reason, a digital sample is usually slightly different from its analog original (this difference is known as "quantization noise").</p> <p>G.711 provides excellent sound quality but requires 64kbps of bandwidth.</p> <p>There are two main algorithms defined in the G.711 standard, the μ-law algorithm (used in North America & Japan) and a-law algorithm (used in Europe and the rest of the world).</p>
G.722	<p>G.722 is an ADPCM codec (see G.723) working at 48 ~ 64 Kbps, with an audio sample rate of 16 KHz. G.722 provides excellent sound quality.</p> <p>Note: The X6004 supports G.722 pass-through, meaning that devices communicating via the X6004 must support this codec.</p>
G.722 AMR-WB (also referred to G.722.2)	<p>G.722.2 is similar to G.722, but with a lower compression rate that can vary according to the amount of available bandwidth. When there is plenty of bandwidth, the compression ratio decreases, and when there is network congestion the compression ratio increases. This is also known as Adaptive Multi Rate - WideBand (AMR-WB).</p> <p>Note: The X6004 supports G.722.2 pass-through, meaning that devices communicating via the X6004 must support this codec.</p>
G.723.1	<p>This is an ITU (International Telecommunication Union) standard for voice coding. The G.723.1 compresses voice audio in 30 ms frames. The G.723.1 operates at two bitrates: 6.3 kbps when sampling at 24 bytes or 5.3 kbps when sampling at 20 bytes per 30 ms frame.</p>
G.726	<p>This is an Adaptive Differential Pulse Code Modulation (ADPCM) waveform codec that uses a lower bitrate than standard PCM conversion. G.726 operates at 16, 24, 32 or 40 kbps. Differential (or Delta) PCM is similar to PCM, but encodes the audio signal based on the difference between one sample and a prediction based on previous samples, rather than encoding the sample's actual quantized value. Many thousands of samples are taken each second, and the differences between consecutive samples are usually quite small, so this saves space and reduces the bandwidth necessary.</p>
G.729	<p>This is an Analysis-by-Synthesis (AbS) hybrid waveform codec. It uses a filter based on information about how the human vocal tract produces sounds. The codec analyzes the incoming voice signal and attempts to synthesize it using its list of voice elements. It tests the synthesized signal against the original and, if it is acceptable, transmits details of the voice elements it used to make the synthesis. Because the codec at the receiving end has the same list, it can exactly recreate the synthesized audio signal.</p> <p>G.729 provides good sound quality and reduces the required bandwidth to 8kbps.</p>

14.1.2 Video Codecs

Video codecs are used by video phones to compress the amount of information sent between two devices. Video codecs encode video signals into digital signals and decode the digital signals back into video signals. The X6004 does not perform any video coding, it does support the passthrough of the following video codecs.

Table 35 Voice Codecs Supported

CODEC	DESCRIPTION
H.261	This is an ITU (International Telecommunication Union) video coding standard. H.261 was designed in 1990 and is considered the first practical video coding standard. The data rate of the coding algorithm is able to operate between 40 kbps and 2 Mbps. H.261 was targeted primarily to work over circuit-switched networks and has since been superseded by more efficient video coding standards.
H.263	This video codec is based closely on the H.261 standard, but as a general rule requires half the bandwidth to achieve the same quality video. H.263 is capable of streaming video at bandwidths as low as 20 kbps to 24 kbps.
H.264	This video codec is video compression technology that falls under the MPEG-4 standard, also known as MPEG-4 Part 10. H.264 can provide excellent video quality at bandwidth from 40 Kbps upwards.

14.2 Authority Group

Use this screen to set up authority groups on the X6004. To access this screen, click **Configuration > PBX > Extension Management > Authority Group**.

Figure 103 Configuration > PBX > Extension Management > Authority Group

Machine ID	Group Name	Description	
IPPBX_001	default	default extension group	
IPPBX_001	test	test description	
IPPBX_001	PM	PM2	

Each field is described in the following table.

Table 36 Configuration > PBX > Extension Management > Authority Group

LABEL	DESCRIPTION
Authority Group	This screen allows you to see which authority groups are configured on the X6004 and it allows you to search extensions configured on the X6004.
Extension Number	Type an extension number and click Query to see if an extension number is already configured on the X6004 and to view its details. See Section 14.2.1 on page 128 for details.
Machine ID	This field indicates the Machine ID of the X6004 on which this authority group was created.
Group Name	This is the name of the authority group.

Table 36 Configuration > PBX > Extension Management > Authority Group

LABEL	DESCRIPTION
Description	This field displays the description for this authority group.
Add, Advanced, Edit, Delete	Click: <ul style="list-style-type: none"> • Add - to create a new authority group. • Advanced - to configure authority group settings. • Edit - to change the name or description of the authority group. • Delete - to remove this authority group from the X6004.

14.2.1 Extension Query Result Screen

The following screen appears when you click **Query** in the **Authority Group** screen. This screen displays the results of your extension query.

Figure 104 Extension Query Result

Authority Group	
Query Result	
Extension Number	2222
Group Name	default
SIP Auth. User Name	2222
Type	SIP
Description	2222
<input type="button" value="Edit"/> <input type="button" value="Back to Authority Group"/>	

Each field is described in the following table.

Table 37 Extension Query Result

LABEL	DESCRIPTION
Query Result	
Extension	This field displays the extension number that you searched for on the X6004.
Group Name	This field displays the authority group to which this extension belongs.
SIP Auth. User Name	This field displays the user name associated with the SIP account for this extension.
Type	This field displays SIP , if this extension is a SIP account or FXS , if this extension is associated with an analog phone connected to an FXS port on the X6004.
Description	This field displays the description given to this extension.
Edit	Click this to go to the configuration screen for this extension.
Back to Authority Group	Click this to go back to the main Authority Group screen.

14.2.2 Add/Edit Authority Group

Use the **Add Authority Group** screen to create a new authority group. Use the **Edit Authority Group** screen to change the name or description of an existing authority group. Only the screen used to add a new authority group is shown. Click the **Add** (or **Edit**) icon in the **Authority Group** screen to view the screen as shown.



Only the **Add Authority Group** screen is shown. In the **Edit Authority Group** screen, not all of the fields are available.

Figure 105 Add/Edit Authority Group

Each field is described in the following table.

Table 38 Add/Edit Authority Group

LABEL	DESCRIPTION
Machine ID	This field is only available when adding a new authority group. If you have configured ZyStack, select the X6004 on which you want to create this authority group.
Group Name	Type a new name or modify an existing name for this authority group. You can use up to 128 alphanumeric characters and spaces are not allowed.
Description	Type a brief description for this authority group. You can use up to 128 alphanumeric characters and spaces are allowed.
Add	If you are creating a new authority group, click Add to add this authority group to the X6004. If you are editing an existing authority group settings, click Apply to save your changes to the X6004.
Cancel	Click this to go back to the main Authority Group screen without saving your changes.

14.2.3 Authority Group Configuration Screen

Use this screen to manage extensions in the authority groups. Click the **Advanced** icon in the **Authority Group** screen to view the screen as shown.

Figure 106 Authority Group Configuration

Authority Group

Peer List

Group Name **default**

Description default extension group Add SIP Peers

SIP Peer

Delete Add Edit Delete

<input type="checkbox"/>	User Name	Type	Extension Number	Description	Add Edit Delete
<input type="checkbox"/>	1111	SIP	1111	Extension 1111	Add Edit Delete
<input type="checkbox"/>	3333	SIP	3333	3333	Add Edit Delete

Delete

FXS Peer

Add Edit Delete

<input type="checkbox"/>	User Name	Type	Extension Number	Description	Add Edit Delete
<input type="checkbox"/>	1003	FXS	1003	1003	Add Edit Delete
<input type="checkbox"/>	1004	FXS	1004	1004	Add Edit Delete
<input type="checkbox"/>	1002	FXS	1002	1002	Add Edit Delete

Cancel

Each field is described in the following table.

Table 39 Authority Group Configuration

LABEL	DESCRIPTION
Peer List	
Group Name	This field displays the name of the authority group you are configuring.
Description	This field displays the description given to the authority group you are configuring.
Add SIP Peers	Click Add SIP Peers if you want to configure multiple extensions for IP phones connected to the X6004.
SIP Peer / FXS Peer	The screen is divided into two sections: the SIP Peer section shows you the extensions created for the IP phones connected to the X6004 and the FXS Peer section shows you the extensions created for the analog phones connected to the X6004.
Delete	Check the Delete box and click Delete to remove this extension from this authority group.
User Name	This is the username associated with an extension for SIP authentication.
Type	This field displays SIP , if this extension is a SIP account or FXS , if this extension is associated with an analog phone connected to an FXS port on the X6004.
Extension Number	This field displays the extension number.
Description	This field displays the description given to this extension.
Add, Edit, Delete	Click: <ul style="list-style-type: none"> Add - to create a new extension on the X6004. Edit - to edit an existing extension on the X6004. Delete - remove an extension from the X6004.

14.3 Extension Features

You can configure the following features on a per extension basis:

- **Call Forwarding** - set up call forwarding rules for the individual extension based on the following criteria:
 - Your extension is busy.
 - You turn on DND (Do Not Disturb). You can set up a list of telephone numbers, referred to as the **White List** that ignore DND.
 - Unconditionally, forwards all calls to a specific extension or your voice mail.
 - There is no answer at your extension. This also allows you to set up a **Find Me List**, which is a list of phone numbers where you might be located.
- **Call Blocking** - set up a list of telephone numbers that you don't want to receive calls from. Or, stop calls without caller ID from reaching your extension.
- **Voice Mail Forwarding** - Configure the X6004 to forward your voice mail messages to your e-mail account.

14.3.1 Add Multiple SIP Peers

Use this screen to configure a range of extensions for IP phones on your network. To access this screen, click **Add SIP Peers** in the **Authority Group** configuration screen.

Figure 107 Add Multiple SIP Extensions

Each field is described in the following table.

Table 40 Add Multiple SIP Extensions

LABEL	DESCRIPTION
Add SIP Peers	
Group	Select the authority group you want these extensions to belong to.

Table 40 Add Multiple SIP Extensions

LABEL	DESCRIPTION
Start Number	Type the first extension number for this range of extensions. Extensions can be from 1 to 20 digits long.
Step/Interval	Type the value of the increment, which the X6004 uses to create this range of extensions.
Amount	Type the number of extensions you want to create. The number of extensions you can create is limited by the subscription service registered on the X6004 (see Section 26.6 on page 233).
SIP Auth. Password	<p>When you create multiple SIP extensions, you automatically create SIP accounts on the X6004. The user names for these SIP accounts are the extension numbers. The passwords for the SIP accounts are also the extension numbers. To make the passwords more secure you can add a prefix or a postfix to these extensions.</p> <p>For example type "1" in the Prefix field and the SIP account passwords for the SIP extensions you create become "1 + extension number".</p> <p>You can enter up to three letters, numbers or a combination of letters and numbers in the Prefix and Postfix fields.</p>
DTMF Mode	<p>Control how the X6004 handles the tones that the IP phones using these extensions make when they push their buttons. One use of the tones is to distinguish between numbers when trying to dial a PSTN phone number. You should use the same mode as your VoIP service provider. The choices are:</p> <ul style="list-style-type: none"> • rfc2833 - Follow the RFC 2833 standard and send the DTMF tones in RTP packets. • inband - Send the DTMF tones in the voice data stream. This works best when you are using a codec that does not use compression (like G.711). Codecs that use compression (like G.729) can distort the tones. • info - Send the DTMF tones in SIP messages.
Codec Setting	<p>Select the type of voice coder/decoder (codec) that you want this extension to use when communicating with the X6004. See Section 14.1.1 on page 126 for more information on voice codecs. The following codecs are supported by the X6004:</p> <ul style="list-style-type: none"> • G.711A (typically used in Europe) • G.711μ (typically used in North America and Japan) • G.729A • G.722 • G.722.2 • G.723.1 - you must activate support for this codec in the Configuration > PBX > Server Configuration > SIP Server screen. • G.726 <p>When two SIP devices start a SIP session, they must agree on a codec.</p> <p>If these SIP extensions are assigned to videophones, you must specify the video codecs used for video calls. The X6004 allows the following video codecs to passthrough:</p> <ul style="list-style-type: none"> • H.261 • H.263 • H.264 • MP4 <p>See Section 14.1.2 on page 127 for more information on video codecs.</p>
Codec Pool	This column indicates the codec types not used for these extensions. You can add a codec type to be used for these extensions by highlighting it and clicking the Right button.
Codec List	This column indicates the codec types used by these extensions. You can organize the priority of the codecs by highlighting it and clicking the Up or Down buttons to move the codec higher or lower in priority. The SIP extensions attempt to use the higher priority codecs first and try the lower priority codecs next. You can remove a codec type from being used from these extension by highlighting it and hitting the Left button.

Table 40 Add Multiple SIP Extensions

LABEL	DESCRIPTION
Apply	Click Apply to save your changes.
Cancel	Click Cancel to go back to Authority Group configuration page without saving your changes.

14.3.2 Add a SIP Extension

Use this screen to add a SIP extension to an authority group on the X6004. To access this screen, click the **Add** icon in the **Authority Group** configuration screen.

Figure 108 Add a SIP Extension

Each field is described in the following table.

Table 41 Add a SIP Extension

LABEL	DESCRIPTION
Basic Setting	
Group	Select the authority group you want this extension to belong to.
Extension Number	Type the extension number for this IP phone extension. The extension number can be from 1 to 20 digits in length.
Web/IVR/VM PIN Code	Type the PIN code that this allows the person with this extension to access the web portal, Interactive Voice Response system or Voice Mail. This value can be up to eight alphanumeric characters and spaces are not allowed.
SIP Auth. User Name	Type the SIP user name associated with this extension. The IP phone registering with the X6004 must provide this for authentication. The user name can be up to 32 alphanumeric characters long. Spaces are not allowed.
SIP Auth. Password	Select Customization and type the SIP password associated with this extension. The IP phone registering with the X6004 must provide this for authentication. The password can be up to 32 alphanumeric characters long. Spaces are not allowed. If you are using auto provisioning (see Chapter 8 on page 103), you can select Random and type the length of the password (4 - 32). The X6004 will assign a random SIP password to this extension. The password will be automatically sent to the IP phone client.
Description	Type a brief description for this SIP extension. This field can be left blank.

Table 41 Add a SIP Extension

LABEL	DESCRIPTION
Apply	Click Apply to save your changes.
Cancel	Click Cancel to go back to the previous screen without saving your changes.

14.3.3 Configure SIP Extensions

After you create SIP extensions you can click on the **Edit** button in the **Authority Group** configuration screen to configure further settings. The **Basic** screen for a SIP extension appears as shown.

Figure 109 SIP Extension: Basic

The screenshot shows the 'SIP Extension: Basic' configuration window. It features a tabbed interface with 'Basic' selected. The 'Basic Setting' section contains the following fields:

- Group:** A dropdown menu currently set to 'Sales'.
- Extension Number:** A text input field containing '1000'.
- Web/IVR/VM PIN Code:** A text input field containing '****'.
- SIP Auth. User Name:** A text input field containing '1000'.
- SIP Auth. Password:** A text input field containing '****'.
- Department:** An empty text input field.
- First Name:** An empty text input field with a yellow highlight.
- Last Name:** An empty text input field with a yellow highlight.
- Description:** An empty text input field.

At the bottom right, there are two buttons: 'Apply' and 'Back to Peer List'.

Each field is described in the following table.

Table 42 SIP Extension: Basic

LABEL	DESCRIPTION
Basic Setting	
Group	Select the authority group you want this extension to belong to.
Extension Number	This field displays the extension number of this SIP extension.
Web/IVR/VM PIN Code	Type the PIN code that this allows the person with this extension to access the web portal, Interactive Voice Response (IVR) system or Voice Mail. This value can be up to eight alphanumeric characters and spaces are not allowed.
SIP Auth. User Name	Type the SIP user name associated with this extension. The IP phone registering with the X6004 must provide this for authentication. The user name can be up to 32 alphanumeric characters long. Spaces are not allowed.
SIP Auth. Password	Type the SIP password associated with this extension. The IP phone registering with the X6004 must provide this for authentication. The password can be up to 32 alphanumeric characters long. Spaces are not allowed.
Department	Type the department for this SIP extension. This field can be left blank.
First Name	Type the first name of the person this SIP extension is assigned to. This field can be left blank.

Table 42 SIP Extension: Basic

LABEL	DESCRIPTION
Last Name	Type the last name of the person this SIP extension is assigned to. This field can be left blank.
Description	Type a brief description for this SIP extension. This field can be left blank.
Apply	Click Apply to save your changes.
Back to Peer List	Click Back to Peer List to go back to Authority Group configuration page without saving your changes.

14.3.4 SIP Extension Call Forward Screen

Use this screen to set up call forwarding and call blocking rules for your extension.



The X6004 checks any system-wide call forwarding (see [Chapter 19 on page 175](#)) and call blocking (see [Section 7.4 on page 99](#)) settings before applying any of the rules created for individual extensions.

To access this screen, click the **Call Forward** tab in any of the SIP extension configuration screens.

Figure 110 SIP Extension: Call Forward

Basic **Call Forward** Voice Mail Advanced

Call Forward Setting

Office Hours

Office Hours ☒ Sun ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri ☒ Sat

Time: 00:00 ~ 00:00

DND(Do Not Disturb) ☒ Disable ☐ Enable (White List) ☐ Voice Mail

Blind Forward ☒ Disable ☐ Enable (Extension Number:) ☐ Voice Mail

Busy Forward ☒ Disable ☐ Enable (Extension Number:) ☐ Voice Mail

No Answer Forward ☐ Disable ☒ Enable (Find Me List) ☐ Voice Mail

After Office Hours ☒ Disable ☐ Enable (Extension Number:) ☐ Voice Mail

Call Blocking Setting

Black list ☒ Disable ☐ Enable (Black List)

Block the calls without Caller ID ☒ Disable ☐ Enable

Apply Back to Peer List

Each field is described in the following table.

Table 43 SIP Extension: Call Forward

LABEL	DESCRIPTION
Call Forward Setting	Use this section to configure call forwarding settings for your extension.
Office Hours	The X6004 has separate rules for call forwarding during office hours then after office hours. The settings you configure specify the office hours for this extension and affect call forwarding during those office hours. If a call is first handled by auto-attendant then it checks the system office hours settings first (and applies any forwarding rules), before checking the office hours configured in this screen.
Office Hours	Specify the days of the week you want to configure as working days for this extension.
Time	Specify the time range in 24 hour format for the office hours.
DND (Do Not Disturb)	Select Enable and the X6004 will not forward calls to your extension. Click on White List (see Section 14.3.5 on page 137) to configure telephone numbers which ignore whether you have DND turned on or off. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
Blind Forward	Select Enable and specify an extension. The X6004 will forward all incoming calls to that extension. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
Busy Forward	Select Enable and specify an extension. The X6004 will forward all incoming calls to that extension when your phone is off the hook. For FXS (analog phones) extensions incoming calls are put into a call waiting queue. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
No Answer Forward	Select Enable and the X6004 will forward all incoming calls to the extensions you specify when you do not answer the phone within the default ring time. The default ring time is configured in the Configuration > PBX > Server Configuration > Global Set screen. Click Find Me List (see Section 14.3.6 on page 137) to specify a list of extensions that the X6004 will forward incoming calls to. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
After Office Hours	These fields specify how to treat calls to your extension that occur after office hours. Select Enable and specify an extension. The X6004 will forward all incoming calls to that extension. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
Call Blocking Setting	Use this section to configure call blocking settings for your extension.
Black List	Select Enable and the X6004 will block all incoming calls from extensions that you specify as blacklisted. Click the Black List (see Section 14.3.7 on page 138) button to configure phone numbers that you want to block from calling you. Select Disable to turn this feature off for this extension.
Block the calls without Caller ID	Select Enable and the X6004 will block all incoming calls from phone that do not send caller ID.
Apply	Click this to save your changes.
Back to Peer List	Click this to go back to the Authority Group configuration screen without saving your changes.

14.3.5 DND White List

Use this screen to edit the **DND White List** for your extension. This is a list of extensions that the X6004 will forward calls from even if you have DND enabled. To access this screen, click the **DND White List** button in the **Call Forward** screen.

Figure 111 DND White List

Each field is described in the following table.

Table 44 DND White List

LABEL	DESCRIPTION
Number	Enter the telephone number you want to allow to call you even if you DND turned on. Click Add and the number you entered displays in the field below.
Delete	Highlight an existing DND White List number and click the Delete icon to remove it from the list.
Apply	Click this to save your changes.
Cancel	Click this to return to the Call Forward screen.

14.3.6 Find Me List

Use this screen to edit the **Find Me List** for your extension. This is a list of extensions that the X6004 tries to call if you do not pick up a call. To access this screen, click the **Find Me List** button in the **Call Forward** screen.

Figure 112 Find Me List

Each field is described in the following table.

Table 45 Find Me List

LABEL	DESCRIPTION
Number	Enter the telephone extension you want the X6004 to forward calls to when you do not pick up a call. Click Add and the number you entered displays in the field below. The
Priority	Highlight an existing Find Me List extension and use the up arrow to move it up in the list or use the down arrow to move it down in the list. The X6004 will try to forward the call to the extensions in the list in the order they appear from top to bottom. If the top extension does not pick up it tries the one below and so on. The X6004 attempts to forward calls to the top (highest priority) five phone numbers only.
Delete	Highlight an existing Find Me List extension and click the Delete icon to remove it from the list.
Apply	Click this to save your changes.
Cancel	Click this to return to the Call Forward screen.

14.3.7 Blacklist

Use this screen to edit the **Black List** for your extension. This is a list of phone numbers from which the X6004 will not forward calls to your extension. To access this screen, click the **Black List** button in the **Call Forward** screen.

Figure 113 Black List

Each field is described in the following table.

Table 46 Black List

LABEL	DESCRIPTION
Number	Enter the telephone number you want to block from calling you when you enable call blocking. Click Add and the number you entered displays in the field below.
Delete	Highlight an existing Black List number and click the Delete icon to remove it from the list.
Apply	Click this to save your changes.
Cancel	Click this to return to the Call Forward screen.

14.3.8 Voice Mail Settings

Use this screen to set up a voice mail settings for this extension. To access this screen, click the **Voice Mail** tab in any of the SIP extension configuration screens.

Figure 114 SIP Extension: Voice Mail

Each field is described in the following table.

Table 47 SIP Extension: Voice Mail

LABEL	DESCRIPTION
Voice Mail Setting	
Received E-mail Address	Specify the e-mail address you want to forward your voice message notifications to. If you select the Attached Voice File option, then complete voice messages are sent to this e-mail address.
Attached Voice File	Select this feature if you want complete voice messages to be sent to the e-mail address you specified in the Received E-mail Address field.
Delete Voice Mail After Mailed	Check this box to delete voicemail messages stored on the X6004 after they have been e-mailed.
Apply	Click this to save your changes.
Back to Peer List	Click this to go back to the previous screen without saving your changes.

14.3.9 SIP Extension Advanced Screen

Use this screen to configure advanced settings for this extension. Click the **Advanced** tab in any of the SIP extension configuration screen to view the screen as shown.

Figure 115 SIP Extension: Advanced Screen

The screenshot shows the 'Advanced' tab of the SIP Extension configuration screen. The 'CODEC Setting' section contains two lists: 'CODEC Pool' and 'CODEC List'. The 'CODEC Pool' list includes G.723.1, G.726, H.263, H.261, and H.264 (pass-through). The 'CODEC List' list includes G.729, G.711 u-law, and G.711 a-law. Arrows between the lists allow for moving codecs. The 'Extra Setting' section includes a 'DTMF Mode' dropdown set to 'info', an unchecked 'MWI Mode' checkbox, and a checked 'Group Pickup' checkbox. At the bottom are 'Apply' and 'Back to Peer List' buttons.

Each field is described in the following table.

Table 48 SIP Extension: Advanced Screen

LABEL	DESCRIPTION
Codec Setting	<p>Select the type of voice coder/decoder (codec) that you want this extension to use when communicating with the X6004. See Section 14.1.1 on page 126 for more information on voice codecs. The following codecs (shown in highest quality to lowest quality order) are supported by the X6004:</p> <p>information on voice codecs. The following codecs are supported by the X6004:</p> <ul style="list-style-type: none"> • G.711A (typically used in Europe) • G.711μ (typically used in North America and Japan) • G.729A • G.722 • G.722.2 • G.723.1 - you must activate support for this codec in the Configuration > PBX > Server Configuration > SIP Server screen. • G.726 <p>When two SIP devices start a SIP session, they must agree on a codec. If these SIP extensions are assigned to videophones, you must specify the video codecs used for video calls. The X6004 allows the following video codecs to passthrough:</p> <ul style="list-style-type: none"> • H.261 • H.263 • H.264 • MP4 <p>See Section 14.1.2 on page 127 for more information on video codecs.</p>
Codec Pool	This column indicates the codec types not used by this extension. You can add a codec type to be used by this extension by highlighting it and hitting the Right button.
Codec List	This column indicates the codec types used by this extension. You can organize the priority of the codecs by highlighting it and clicking the Up or Down buttons to move the codec higher or lower in priority. The SIP extension attempts to use the higher priority codecs first and tries the lower priority codecs next. You can remove a codec type from being used from this extension by highlighting it and hitting the Left button.
Extra Setting	

Table 48 SIP Extension: Advanced Screen

LABEL	DESCRIPTION
DTMF Mode	Control how the X6004 handles the tones that the IP phone using this extension makes when you push its buttons. One use of the tones is to distinguish between numbers when trying to dial a PSTN phone number. You should use the same mode as your VoIP service provider. The choices are: <ul style="list-style-type: none"> • rfc2833 - Follow the RFC 2833 standard and send the DTMF tones in RTP packets. • inband - Send the DTMF tones in the voice data stream. This works best when you are using a codec that does not use compression (like G.711). Codecs that use compression (like G.729) can distort the tones. • info - Send the DTMF tones in SIP messages.
MWI Mode	Check this box to enable Message Waiting Indicator (MWI) mode for this extension. The X6004 sends a beeping tone to the IP phone when there is at least one voicemail for this extension.
Group Pickup	Check this box if you want to enable the group pickup feature for this extension. If this extension is added to a pickup group, then the phone at this extension rings when any extension that is part of this pickup group is called. See Chapter 16 on page 155 for more information on group pickup.
Apply	Click this to save your changes.
Back to Peer List	Click this to go back to the Authority Group configuration screen without saving your changes.

14.3.10 Add an FXS Extension

Use this screen to add an FXS extension to an authority group on the X6004. To access this screen, click the **Add** icon in the **Authority Group** configuration screen.

Figure 116 Add an FXS Extension

Each field is described in the following table.

Table 49 Add an FXS Extension

LABEL	DESCRIPTION
Basic Setting	
Extension Number	Type the extension number for this analog phone extension. The extension number can be from 1 to 20 digits in length.
Interface	Specify the location on the FXS interface card that the analog phone with this extension is connected to.
Web/IVR/VM PIN Code	Type the PIN code that this allows the person with this extension to access the web portal, Interactive Voice Response system or Voice Mail. This value can be up to eight alphanumeric characters and spaces are not allowed.

Table 49 Add an FXS Extension

LABEL	DESCRIPTION
Description	Type a brief description for this FXS extension. This field can be left blank.
Apply	Click Apply to save your changes.
Cancel	Click Cancel to go back to Authority Group configuration page without saving your changes.

14.3.11 Configure FXS Extensions

After you create FXS extensions you can click on the **Edit** button in the **Authority Group** configuration screen to configure further settings associated with the extensions. The **Basic** screen for an FXS extension appears as shown.

Figure 117 FXS Extension: Basic

The screenshot shows the 'Basic' configuration tab for an FXS extension. The 'Basic Setting' section includes the following fields:

- Group:** A dropdown menu with 'Sales' selected.
- Extension Number:** A text input field containing '5000'.
- Interface:** Two dropdown menus, 'Slot' with 'Slot A' selected and 'Port' with 'Port 1' selected.
- Web/IVR/VM PIN Code:** A text input field containing '****'.
- Department:** An empty text input field.
- First Name:** An empty text input field.
- Last Name:** An empty text input field.
- Description:** A text input field containing '5000'.

At the bottom of the form are two buttons: 'Apply' and 'Back to Peer List'.

Each field is described in the following table.

Table 50 FXS Extension: Basic

LABEL	DESCRIPTION
Basic Setting	
Group	Select the authority group you want this extension to belong to.
Extension Number	Type the extension number for this analog phone extension.
Interface	Specify the location on the FXS interface card that the analog phone with this extension is connected to.
Web/IVR/VM PIN Code	Type the PIN code that this allows the person with this extension to access the web portal, Interactive Voice Response system or Voice Mail. This value can be up to eight alphanumeric characters and spaces are not allowed.
Department	Type the department for this SIP extension. This field can be left blank.
First Name	Type the first name of the person this FXS extension is assigned to. This field can be left blank.
Last Name	Type the last name of the person this FXS extension is assigned to. This field can be left blank.
Description	Type a brief description for this SIP extension. This field can be left blank.

Table 50 FXS Extension: Basic

LABEL	DESCRIPTION
Apply	Click Apply to save your changes.
Back to Peer List	Click Back to Peer List to go back to Authority Group configuration page without saving your changes.

14.3.12 FXS Extension Call Forward Screen

Use this screen to set up call forwarding and call blocking rules for your extension. To access this screen, click the **Call Forward** tab in any of the FXS extension configuration screens.

Figure 118 FXS Extension: Call Forward

The screenshot shows the 'Call Forward' configuration screen for an FXS extension. It features four tabs: 'Basic', 'Call Forward' (active), 'Voice Mail', and 'Advanced'. The 'Call Forward Setting' section includes 'Office Hours' with checkboxes for Sun through Sat and a time range (00:00 to 00:00). Below this are options for DND (Do Not Disturb), Blind Forward, Busy Forward, No Answer Forward, and After Office Hours. Each of these has radio buttons for 'Disable' and 'Enable', followed by a list selection (e.g., 'White List', 'Find Me List') and a 'Voice Mail' option. The 'Call Blocking Setting' section includes 'Black list' and 'Block the calls without Caller ID', each with 'Disable' and 'Enable' radio buttons. At the bottom are 'Apply' and 'Back to Peer List' buttons.

The fields in this screen are the same as the fields for SIP extension call forwarding screen. Refer to [Table 43 on page 136](#) for detailed field descriptions.

14.3.13 FXS Extension Voice Mail Screen

Use this screen to set up a voice mail settings for this extension. To access this screen, click the **Voice Mail** tab in any of the FXS extension configuration screens.

Figure 119 FXS Extension: Voice Mail

Basic	Call Forward	Voice Mail	Advanced
Voice Mail Setting			
Received E-mail Address:		<input type="text"/>	
<input type="checkbox"/> Attached Voice File			
<input type="checkbox"/> Delete Voice Message After Mailed			
		<input type="button" value="Apply"/> <input type="button" value="Back to Peer List"/>	

The fields in this screen are the same as the fields for SIP extension voice mail screen. Refer to [Table 47 on page 139](#) for detailed field descriptions.

14.3.14 FXS Extension Advanced Screen

Check the **Group Pickup** box in this screen if you want to enable the group pickup feature for this extension. If this extension is added to a pickup group, then this phone can be used to pick up calls to any extension that is part of a pickup group. See [Chapter 16 on page 155](#) for more information on group pickup.

Figure 120 FXS Extension: Advanced Screen

Basic	Call Forward	Voice Mail	Advanced
Extra Setting			
<input checked="" type="checkbox"/> Group Pickup			
		<input type="button" value="Apply"/> <input type="button" value="Back to Peer List"/>	

Ring Group

This chapter shows you how to create and manage ring groups on the X6004.

15.1 Ring Group Overview

Ring groups on the X6004 refer to grouping sets of extensions for:

- **Paging** - the caller can simply dial a number configured for a group of extensions. The telephones with the extensions in the group automatically pick up. It is similar to creating an automatic conference call.
- **Hunting** - the caller can simply dial a number to reach a group of extensions. The extensions ring based on a ringing method you configure. For example, all extensions can ring at the same time until the call is picked up or extensions in the group ring in a random order until the call is picked up.

15.2 Ring Group Configuration

Use this screen to set up ring groups on the X6004. To access this screen, click **Configuration > PBX > Extension Management > Ring Group**.

Figure 121 Configuration > PBX > Extension Management > Ring Group

Ring Group			
Ring Group			
<div> :Add :Advanced :Edit :Delete </div>			
Machine ID	Group Name	Description	
IPPBX_001	Sales	Sales	
IPPBX_001	RD	RD	

Each field is described in the following table.

Table 51 Configuration > PBX > Extension Management > Ring Group

LABEL	DESCRIPTION
Machine ID	This field displays the ID of the X6004 on which a ring group is configured.
Group Name	This field displays the name assigned to this ring group.

Table 51 Configuration > PBX > Extension Management > Ring Group

LABEL	DESCRIPTION
Description	This field displays the description of the ring group.
Add, Advanced, Edit, Delete	Click: <ul style="list-style-type: none"> Add - to create a new ring group. Advanced - to configure the settings of a ring group. Edit - to change the description of a ring group. Delete - remove an existing ring group.

15.2.1 Create a New Ring Group

Use this screen to create a new ring group. To access this screen, click **Configuration > PBX > Extension Management > Ring Group > Add**.

Figure 122 Configuration > PBX > Extension Management > Ring Group > Add

Each field is described in the following table.

Table 52 Configuration > PBX > Extension Management > Ring Group > Add

LABEL	DESCRIPTION
Add Ring Group	
Machine ID	Select the ID of the X6004 on which you want to configure the ring group. This is an internal name (not configurable) of the X6004. Only one choice is shown if you have not configured ZyStack.
Group Name	Type the name of this ring group. You can use alpha-numeric characters and spaces are not allowed.
Description	Type the description for this ring group. You can use alpha-numeric characters and spaces are allowed.
Add	Click this to save your changes.
Cancel	Click this to go back to the previous screen without saving your changes.

15.2.2 Edit Ring Group Description

Use this screen to change the description for a ring group. To access this screen, click **Configuration > PBX > Extension Management > Ring Group > Edit**.

Figure 123 Configuration > PBX > Extension Management > Ring Group > Edit

Each field is described in the following table.

Table 53 Configuration > PBX > Extension Management > Ring Group > Edit

LABEL	DESCRIPTION
Ring Group Edit	
Group Name	This field displays the name of this ring group.
Description	Type the description for this ring group. You can use alpha-numeric characters and spaces are allowed.
Apply	Click this to save your changes.
Cancel	Click this to go back to the previous screen without saving your changes.

15.2.3 Configure Ring Group Settings

Use this screen to create paging groups, hunt groups or both. To access this screen, click **Configuration > PBX > Extension Management > Ring Group > Advanced**.

Figure 124 Configuration > PBX > Extension Management > Ring Group > Advanced

Each field is described in the following table.

Table 54 Configuration > PBX > Extension Management > Ring Group > Advanced

LABEL	DESCRIPTION
Paging	Use this section to manage page groups.
Delete	Check the Delete box(es) and click Delete to remove page group(s).
Entry Number	This field displays the number you have to dial to call the extensions in this page group.

Table 54 Configuration > PBX > Extension Management > Ring Group > Advanced

LABEL	DESCRIPTION
Type	This field displays “page”.
Description	This field displays the description for this page group.
Add, Edit, Delete	Click: <ul style="list-style-type: none"> • Add - to create a new page group. • Edit - to configure the settings of a page group. • Delete - remove an existing page group.
Hunt	Use this section to manage hunt groups.
Delete	Check the Delete box(es) and click Delete to remove hunt groups.
Entry Number	This field displays the number you have to dial to call the extensions in this hunt group.
Type	This field displays “hunt”.
Description	This field displays the description for this hunt group.
Add, Edit, Delete	Click: <ul style="list-style-type: none"> • Add - to create a new hunt group. • Edit - to configure the settings of a hunt group. • Delete - remove an existing hunt group.

15.2.4 Add/Edit Page Group Screen

The screens for editing or adding page groups on the X6004 contain the same fields. Only the screen used to add page groups is shown below. Click the **Add** (or **Edit**) icon in the **Paging** section of the **Ring Group** configuration screen to view the screen as shown.

Figure 125 Add/Edit Page Group

The screenshot shows the 'Add/Edit Page Group' screen. It features a 'Page' tab at the top. Below the tab, there are several input fields: 'Entry Number' with the value '0009', 'Pincode' with a hint '(0 ~ 9; *)', 'Max Paging Time' with a hint '(10 ~ 3600 sec)', and a 'Description' field. Below these fields is a table with two columns: 'Peer Pool' and 'Selected Member'. The 'Peer Pool' column contains a list of extensions: 1111, 1003, 1004, 3333, and 1002. The 'Selected Member' column is currently empty. At the bottom of the screen, there are 'Apply' and 'Cancel' buttons.

Each field is described in the following table.

Table 55 Add/Edit Page Group

LABEL	DESCRIPTION
Entry Number	Type the number you have to dial to call the extensions in this page group. This number can be from 1 to 16 digits long.
Pincode	Type the password you have to dial to call the extensions in this page group. This number can be from 0 to 16 digits long and you can also use the “*” key. If you leave this field blank then callers do not have to dial a Pincode to call the extensions in this page group.

Table 55 Add/Edit Page Group

LABEL	DESCRIPTION
Max Paging Time	Type the maximum number of seconds that a person can page a group of extensions.
Description	Type a description for this page group.
Extensions	Move the extensions you want to be in this page group to the Selected Member column by highlighting them in the Peer Pool column and clicking the Right icon. Remove the extensions you don't want to be in this page group from the Selected Member column by highlighting them and clicking the Left icon.
Apply	Click Apply to save your changes and to apply them to the X6004.
Cancel	Click Cancel to go back to the Ring Group configuration page without saving your changes.

15.2.5 Add/Edit Hunt Group Screen

The screens for editing or adding hunt groups on the X6004 contain the same fields. Only the screen used to add hunt groups is shown below. Click the **Add** (or **Edit**) icon in the **Hunt** section of the **Ring Group** configuration screen to view the screen as shown.

Figure 126 Add/Edit Hunt Group

Each field is described in the following table.

Table 56 Add/Edit Hunt Group

LABEL	DESCRIPTION
Entry Number	Type the number you have to dial to call the extensions in this hunt group. This number can be from 1 to 16 digits long.
Description	Type a description for this hunt group.

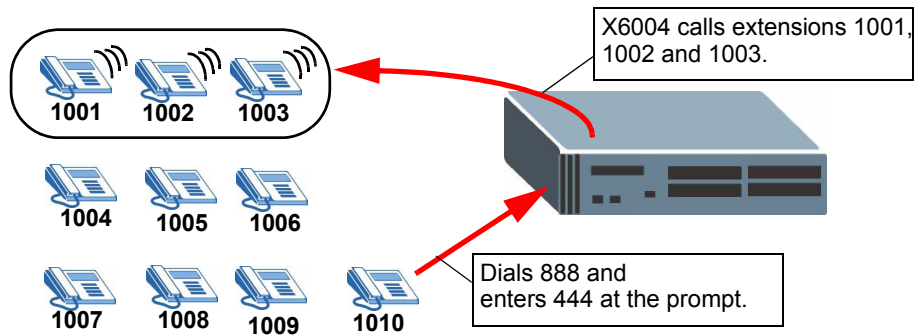
Table 56 Add/Edit Hunt Group

LABEL	DESCRIPTION
Ring Algorithm	<p>Select the method for the X6004 to decide the ring order of extensions in this hunt group.</p> <ul style="list-style-type: none"> • Ring All - ring all extensions at the same time until one answers. • Round Robin - take turns ringing each available (not engaged) extension in the hunt group. Start with the first extension (top in the Selected Member column) in this group. • Least Recent - ring the extension which was least recently called in this group. • Fewest Calls - ring the extension with fewest completed calls in this group. • Random - ring a random extension. • Round Robin with Memory - take turns ringing each available (not engaged) extension in the hunt group. Start with the extension that follows (is below in the Selected Member column) the extension that last picked up a call in this hunt group.
Office Hours	<p>Select the extensions that you want to be in this hunt group during the office hours period you configured for the X6004. (See Chapter 13 on page 123.)</p> <p>Move the extensions you want to be in this hunt group to the Selected Member column by highlighting them in the Peer Pool column and clicking the Right icon.</p> <p>Remove the extensions you don't want to be in this hunt group from the Selected Member column by highlighting them and clicking the Left icon.</p>
Night Service	<p>Select the extensions that you want to be in this hunt group in the off hours period (not during office hours) you configured for the X6004. (See Chapter 13 on page 123.)</p> <p>Move the extensions you want to be in this hunt group to the Selected Member column by highlighting them in the Peer Pool column and clicking the Right icon.</p> <p>Remove the extensions you don't want to be in this hunt group from the Selected Member column by highlighting them and clicking the Left icon.</p>
Apply	Click Apply to save your changes and to apply them to the X6004.
Cancel	Click Cancel to go back to the Ring Group configuration page without saving your changes.

15.2.6 Paging Group Example

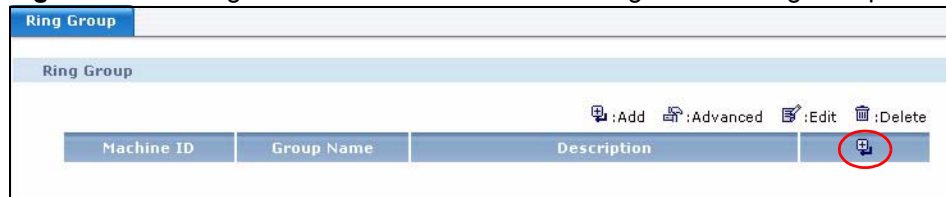
The following sections show you how to create page groups. Paging groups are sets of extensions that can all be called at the same time by dialing a single number (page group number). When a page group number is dialed, all of the extensions automatically pick up via speakerphone. One use of this feature can be to make announcements. A boss can dial the page group number to say “Meeting in five minutes!!” or “Lunch time!!! It’s on me”.

This example shows you how to create a single page group. The paging group is for the marketing team and is made up of extensions **1001**, **1002** and **1003**. The example also gives the right to any member of authority group **Basic** (all extensions in our configuration) to call the page group. The page group number is **888**, it is also configured with a PIN code **444** so that only the people who know the code can page the **Marketing** group.

Figure 127 Paging Group Example

Procedure:

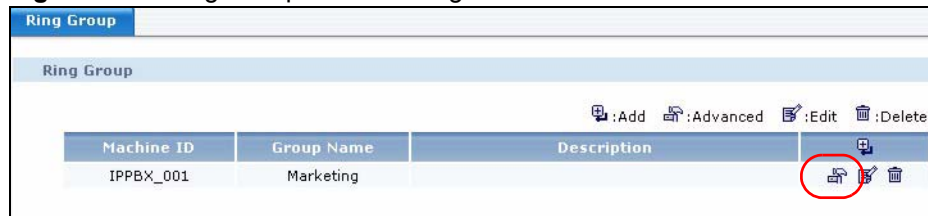
- 1 In the web configurator, click **Configuration > PBX > Extension Management > Ring Group** to open the following screen.

Figure 128 Configuration > PBX > Extension Management > Ring Group

- 2 Click the **Add** icon to open the following screen. Type **Marketing** in the Group Name field and **Add** to save the ring group.

Figure 129 Add Ring Group

- 3 The **Ring Group** screen appears as shown. Click the **Advanced** icon next to the **Marketing** ring group entry.

Figure 130 Ring Group for Marketing

- 4 The configuration screen for the **Marketing** ring group opens up. Click **Add** in the **Paging** section.

Figure 131 Ring Group for Marketing

- 5 The **Page** screen opens up. Type **888** in the **Entry Number** field, **444** in the **Pincode** field and **300** in the **Max Paging Time** field (this last entry keeps the paging time to a maximum of five minutes). Next, highlight the extensions you want to belong to the **Marketing** page group one at a time and use the **Right** icon to move them to the **Selected Member** column. Click **Apply** when you are done.


Figure 132 Ring Group for Marketing

- 6 You are done configuring the **Marketing** page group. You still have to assign rights to it, so that members of the **Basic** authority group can use this feature. Click **Configuration > PBX > Group Management** and click the **Advanced** icon next to the **Basic** authority group as shown next.


Figure 133 Configuration > PBX > Group Management

Group Management


Authority Group

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	Basic		

FX0 Trunk

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	PSTN1		

SIP Trunk

Machine ID	Group Name	Description	Advanced Setting
IPPBX_001	ITSP1		

Trusted Peer

Machine ID	Group Name	Description	Advanced Setting
------------	------------	-------------	------------------

7 Select the **Marketing** check box in the **Advanced Setting** column and click **Apply**.

Figure 134 Page Group to Authority Group Assignment

Group Management

Accessible Group List

Group Name Basic

Group Name	Description	Group Type	Advanced Setting
ezout	easy to call out	LCR	<input type="checkbox"/>
local_call	local call LCR	LCR	<input checked="" type="checkbox"/>
long_distance_call	long distance call LCR	LCR	<input checked="" type="checkbox"/>
international_call	international call LCR	LCR	<input type="checkbox"/>
Marketing		Ring Group	<input checked="" type="checkbox"/>

Apply Cancel

Callers from extensions in the **Basic** authority group can now dial **888**, enter the PIN code **444** and page the **Marketing** page group.

Pickup Group

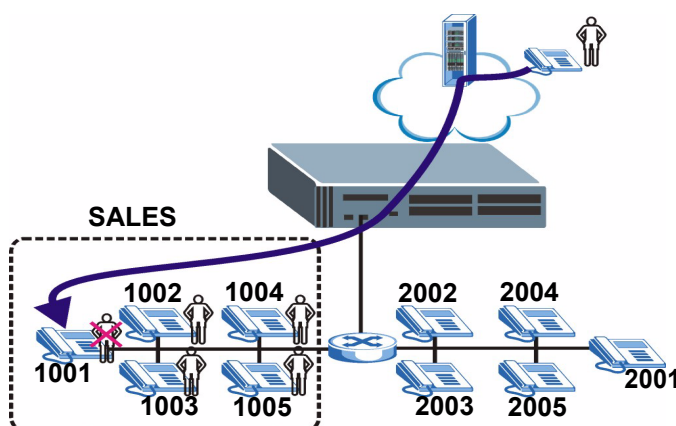
This chapter shows you how to configure and manage pickup groups on the X6004.

16.1 Pickup Group Overview

The X6004 allows you to organize sets of extensions into pickup groups. All telephone users with extensions in the same pickup group can answer incoming calls for any member of that group. For example, you may want to configure a pickup group for your sales department. If a call comes in to one salesperson but they are not available to answer the call, then another member of the sales team can pickup the call. The members pickup the call by dialing the feature code for **Group Pickup**. See [Section 7.5 on page 100](#) for information on how to configure the feature codes on the X6004.

The following figure shows a pickup group called **SALES**. Extensions 1001 - 1005 are in the **SALES** pickup group. When a call comes in to extension 1001, then people with extensions 1002, 1003, 1004 or 1005 can pickup the call by dialing the feature code for **Group Pickup** (for example *94 is the default). Similarly, when a call comes in to any of the other extensions in this pickup group, then any of the group members can pickup that call.

Figure 135 Pickup Group Overview



When two calls come in at the same time, then the call that has rung the longest is picked up first when a group member dials the **Group Pickup** code.

When two group members try to pick up a call for someone in their pickup group, then the first person to dial the **Group Pickup** code answers the call.

16.1.1 Pickup Group Settings

Use this screen to manage pickup groups on the X6004. To access this screen, click **Configuration > PBX > Extension Management > Pickup Group**.

Figure 136 Configuration > PBX > Extension Management > Pickup Group

Each field is described in the following table.

Table 57 Configuration > PBX > Extension Management > Pickup Group

LABEL	DESCRIPTION
Delete	Check the Delete box and click Delete to remove this pickup group from the X6004.
Machine ID	This field displays the Machine ID on which this pickup group is configured.
Group name	This field displays a pickup group name configured on the X6004.
Description	This field displays a description given to this pickup group.
Add, Edit, Delete	Click: <ul style="list-style-type: none"> Add - to set up a new pickup group on the X6004. Edit - to change the pickup group settings of an existing pickup group. Delete - remove a pickup group from the X6004.

16.1.2 Add/Edit Pickup Groups

Use the **Add Group** screen to create a new pickup group. Use the **Edit Group** screen to add or remove extensions from a pickup group. To access this screen, click the **Add** or **Edit** icon in the **Configuration > PBX > Extension Management > Pickup Group** screen. Only the Add Group screen is shown.

Figure 137 Configuration > PBX > Extension Management > Pickup Group: Add/Edit

Each field is described in the following table.

Table 58 Configuration > PBX > Extension Management > Pickup Group: Add/Edit

LABEL	DESCRIPTION
Pickup Group	
Machine ID	Select the X6004 on which you want to configure this pickup group. This field is read-only when editing an existing pickup group.
Group name	Type a name for this pickup group. Use alpha-numeric characters and spaces are not allowed. This field is read-only when editing an existing pickup group.
Description	Type a description for this pickup group. Use alpha-numeric characters and spaces are not allowed. This field is read-only when editing an existing pickup group.
Extensions Select	Click on an extension in the Extensions Pool column to highlight it and use the Right icon to move it to the Extensions Select column. This adds this extension to the pickup group. Click on an extension in the Extensions Select column to highlight it and use the Left icon to move it to the Extensions Pool column. This removes this extension from the pickup group. Note: You must make sure that Group Pickup is enabled in the Advanced section of the SIP or FXS extension configuration page (Configuration > PBX > Extension Management > Authority Group > Edit FXS Peer/Edit SIP Peer).
Apply	Click Apply to save your changes.
Cancel	Click Cancel to go back to the previous screen.

Call Access Code

This chapter shows you how to configure a call access code for authority groups and how to set a maximum length for extensions.

17.1 Call Access Code

The call access code allows you to use the outbound dialing rules assigned to your authority group from extensions that do not have the same outbound dialing rules assigned to them.

For example, you belong to authority group A and you can make both local and long distance calls from your extension. Your secretary, however, belongs to authority group B and can only make local calls. When you try to make a long distance call from your secretary's extension the X6004 does not allow it and prompts you to enter the access code associated with your authority group. After you enter the access code, your long distance call goes through.

Use this screen to manage the access codes for authority groups on the X6004. To access this screen, click **Configuration > PBX > Extension Management > Call Access**.

Figure 138 Configuration > PBX > Extension Management > Call Access

Each field is described in the following table.

Table 59 Configuration > PBX > Extension Management > Call Access

LABEL	DESCRIPTION
Delete	Check the Delete box and click Delete to remove this call access code setting.
Group	This field displays an authority group name that has been set up with an access code.
Access Code	This field displays the access code.
Add, Edit, Delete	Click one of the following options: <ul style="list-style-type: none"> Add - to set up an access code for an authority group on the X6004. Edit - to change the access code for an authority group. Delete - remove an access code configured for an authority group.

17.1.1 Set Call Access Code Screen

Use this screen to edit or create an access code on the X6004. To access this screen, click the **Edit** or **Add** icons in the **Call Access Code** screen.

Figure 139 Configuration > PBX > Extension Management > Call Access Code: Edit/Add

Each field is described in the following table.

Table 60 Configuration > PBX > Extension Management > Call Access Code: Edit/Add

LABEL	DESCRIPTION
Set Call Access Code	
Group	Select the authority group you want to configure a call access code for. You can only create one call access code per authority group.
Access Code	Type the access code for this authority group.
Apply	Click this to save your changes.
Cancel	Click Cancel to return to Call Access Code screen without saving your changes.

17.1.2 Internal Extension Length

Specify the length range of phone numbers for internal calls. The X6004 treats these calls as an extension to extension call and does not try to use an outside line when making these calls. If the length of the number dialed fits in this range, but the extension does not exist on the X6004 then the call is dropped.

Click **Configuration > PBX > Extension Management > Call Access Code > Internal Extension Length**, to view the screen as shown.

Figure 140 Configuration > PBX > Extension Management > Call Access Code > Internal Extension Length

Each field is described in the following table.

Table 61 Configuration > PBX > Extension Management > Call Access Code > Internal Extension Length

LABEL	DESCRIPTION
Internal Extension Length	Specify the range of the length of telephone numbers that are treated by the X6004 as extension to extension calls.
Apply	Click this to save your changes.

Outbound Line Group

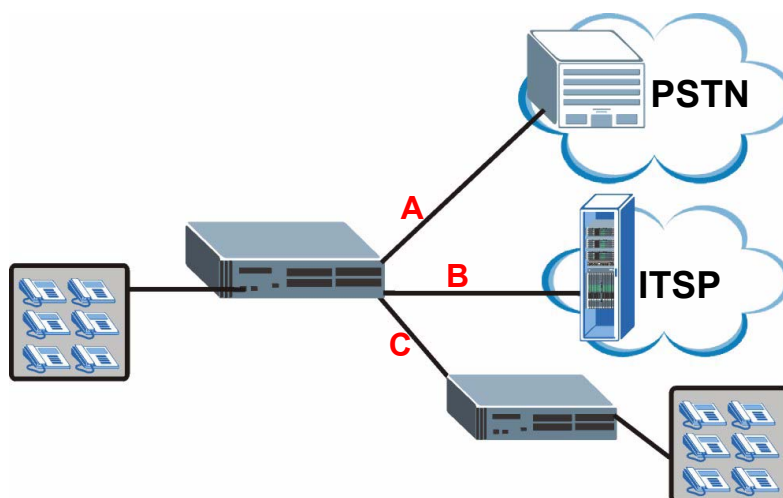
This chapter shows you how to manage outside lines on the X6004.

18.1 Outbound Line Group Overview

The following diagram shows the X6004 connected to three possible types of outside connections:

- FXO Trunk (**A**): shows the X6004 connected to the PSTN (Public Switched Telephone Network) via an FXO port on the X6004. You can also use the FXO ports to connect to a traditional PBX, if your organization has one. You must have an FXO interface card installed on the X6004 to configure these connections.
- SIP Trunk (**B**): shows the X6004 connected to a SIP server at your VoIP service provider. You can use the SIP trunk to connect to a SIP server on which you have an existing SIP account.
- Trusted Peer (**C**): shows the X6004 connected to another X6004 (for example, at your branch office). You can establish a trusted peer connection with another SIP server that lists your X6004 as a trusted peer.

Figure 141 Outbound Line Overview



The outbound lines define a connection between the X6004 and PSTN, ITSP or your trusted peer. To make calls from extensions on your network you still have to define LCRs, which are outbound dialing rules (See [Chapter 20 on page 185](#)). You also have to configure an auto-attendant to handle the forwarding of incoming calls (See [Chapter 19 on page 175](#)).

18.2 Outbound Line Group Screen

Use this screen to manage the outside lines on the X6004. To access this screen, click **Configuration > PBX > Outbound Line Management > Outbound Line Group**.

Figure 142 Configuration > PBX > Outbound Line Management > Outbound Group

Outbound Line Group			
FXO Trunk			
:Add :Advanced :Edit :Delete :Auto-Attendant			
Machine ID	Group Name	Description	
IPPBX_001	FXO1	Outgoing Group for FXO1	
SIP Trunk			
Machine ID	Group Name	Description	
IPPBX_001	SIP1	Outgoing Group for SIP1	
Trusted Peer			
Machine ID	Group Name	Description	
IPPBX_001	Group1	Group1 Peers	

Each field is described in the following table.

Table 62 Configuration > PBX > Outbound Line Management > Outbound Group

LABEL	DESCRIPTION
FXO Trunk / SIP Trunk / Trusted Peer	<p>These headings divide the screen into sections based on the type of outside line you have configured:</p> <ul style="list-style-type: none"> • FXO Trunk - refers to a connection from the X6004 to the PSTN (your local telephone company) via the FXO port on the X6004. • SIP Trunk - refers to a connection from the X6004 to a SIP server at your VoIP service provider. • Trusted Peer - refers to a connection to another SIP server (for example another X6004) that has configured your X6004 as a trusted peer.
Machine ID	This field displays the ID of the X6004 on which an outside line is configured.
Group Name	This field displays the name of an outside line.
Description	This field displays the description for an outside line.
Add, Advanced, Edit, Delete, Auto Attendant	<p>Select from one of the following choices:</p> <ul style="list-style-type: none"> • Add - to create a new outbound line group. • Advanced - to configure the settings of an outbound line group. • Edit - to change the name or description of an outbound line group. • Delete - to remove an existing outbound line group. • Auto Attendant - to assign an auto attendant to an outbound line group.

18.3 FXO Trunk Configuration

FXO trunks allow you to connect to the PSTN (your local traditional telephone service provider) or a traditional PBX in your organization. In order to create an FXO trunk you must already have an FXO interface card installed on the X6004. See the Quick Start Guide for information on installing your FXO interface card.

18.3.1 Add/Edit FXO Trunk

The screens for editing or adding FXO trunks on the X6004 contain the same fields. Only the screen used to add FXO trunks is shown below. Click the **Add** (or **Edit**) icon in the **FXO Trunk** section of the **Outbound Line Group** configuration screen to view the screen as shown.

Figure 143 Add/Edit FXO Interface

Each field is described in the following table.

Table 63 Add/Edit FXO Interface

LABEL	DESCRIPTION
Machine ID	Select the ID of the X6004 on which you want to configure the FXO interface. This is an internal name (not configurable) of the X6004. Only one choice is shown if you have not configured ZyStack. This field is not available when editing an FXO configuration.
Group Name	Type the name of this FXO interface. You can use alpha-numeric characters and spaces are not allowed.
Description	Type the description for this FXO interface. You can use alpha-numeric characters and spaces are allowed.
Apply	Click Apply to save your changes.
Back to Outbound Group/Cancel	Click this to go to the Outbound Line Group screen without saving your changes.

18.3.2 Configure an FXO Trunk

Use this screen to configure an FXO Trunk. Click the **Advanced** icon in the **FXO Trunk** section of the **Outbound Line Group** configuration screen to view the screen as shown.

Figure 144 Configure an FXO Interface

Each field is described in the following table.

Table 64 Configure an FXO Interface

LABEL	DESCRIPTION
Available Interface	This column displays the FXO ports available on the X6004. Highlight one of the FXO ports and click the Right icon if you want to add it to this outbound line group.
Used Interface	This column displays the FXO ports currently configured for this outbound line group. Highlight one of the FXO ports and click the Left icon if you want to remove it from the outbound line group.
Apply	Click this to save your changes.
Cancel	Click this to go to the Outbound Line Group screen without saving your changes.

18.3.3 Auto-Attendant for Incoming Calls

Use this screen to select which auto-attendant should be used with this outbound line group. See [Chapter 19 on page 175](#) for information on configuring auto-attendant. Click the **Auto-Attendant** icon in the in the **FXO Trunk** section of the **Outbound Group** configuration screen to view the screen as shown.

Figure 145 AA for FXO Trunks

Each field is described in the following table.

Table 65 AA for Incoming Calls

LABEL	DESCRIPTION
Apply AA	Select the Auto-Attendant you want to use when calls come in on this outbound line group. If you want to forward all incoming calls on this FXO trunk to be forwarded to a fax machine located at a specific extension, then select FAX .
Extension Number for Fax	This field is only available if you select FAX in the Apply AA field. Type the extension of the Fax machine you want to forward calls to.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to go to the Outbound Group screen without saving your changes.

18.4 SIP Trunk Configuration

SIP trunks allow you to connect to VoIP service provider. In order to create a SIP trunk you must already have a SIP account and a network connection to your VoIP service provider.

18.4.1 Add/Edit SIP Trunk

The screens for editing or adding SIP trunks on the X6004 contain the same fields. Only the screen used to add SIP trunks is shown below. Click the **Add** (or **Edit**) icon in the **SIP Trunk** section of the **Outbound Line Group** configuration screen to view the screen as shown.

Figure 146 Add/Edit SIP Trunk

Each field is described in the following table.

Table 66 Add/Edit SIP Trunk

LABEL	DESCRIPTION
Machine ID	Select the ID of the X6004 on which you want to configure the SIP trunk. This is an internal name (not configurable) of the X6004. Only one choice is shown if you have not configured ZyStack. This field is not available when editing a SIP trunk configuration.
Group Name	Type the name of this SIP trunk. You can use alpha-numeric characters and spaces are not allowed.
Description	Type the description for this SIP interface. You can use alpha-numeric characters and spaces are allowed.
Apply	Click this to save your changes.
Back to Outbound Group/Cancel	Click this to go to the Outbound Line Group screen without saving your changes.

18.4.2 Configure a SIP Trunk

Use this screen to configure a SIP trunk. Click the **Advanced** icon in the **SIP Trunk** section of the **Outbound Line Group** configuration screen to view the screen as shown.

Figure 147 Configure a SIP Trunk

Outbound Line Group

SIP Setting

Number: 777000

SIP Local Port: 5060

SIP Server Address: 172.21.10.91

SIP Server Port: 5060

REGISTER Server Address: 172.21.10.91

REGISTER Server Port: 5060

SIP Service Domain: 172.21.10.91

DTMF Mode: info

Caller ID: ☒ On ☐ Extension Number

Authentication

User Name: 777000

Password: ****

CODEC Setting

CODEC Pool		CODEC List	
H.263 H.261	→ ←	G.711 u-law G.711 a-law G.729A G.723.1 G.726	Up Down

Apply Cancel

Each field is described in the following table.

Table 67 Configure a SIP Trunk

LABEL	DESCRIPTION
SIP Setting	
Number	Enter the SIP number associated with the SIP account for this SIP trunk. In the full SIP URI, this is the part before the @ symbol. You can use up to 127 printable ASCII characters.
SIP Local Port	Enter the X6004's listening port number, if your VoIP service provider gave you one. Otherwise, keep the default value.
SIP Server Address	Enter the IP address or domain name of the SIP server provided by your VoIP service provider. You can use up to 95 printable ASCII characters. It does not matter whether the SIP server is a proxy, redirect or register server.
SIP Server Port	Enter the SIP server's listening port number, if your VoIP service provider gave you one. Otherwise, keep the default value.
REGISTER Server Address	Enter the IP address or domain name of the SIP register server, if your VoIP service provider gave you one. Otherwise, enter the same address you entered in the SIP Server Address field. You can use up to 95 printable ASCII characters.
REGISTER Server Port	Enter the SIP register server's listening port number, if your VoIP service provider gave you one. Otherwise, enter the same port number you entered in the SIP Server Port field.
SIP Service Domain	Enter the SIP service domain name. In the full SIP URI, this is the part after the @ symbol. You can use up to 127 printable ASCII Extended set characters.

Table 67 Configure a SIP Trunk

LABEL	DESCRIPTION
DTMF Mode	<p>Control how the X6004 handles the tones that the IP phones on your network make when they push their buttons. One use of the tones is to distinguish between numbers when trying to dial a PSTN phone number. You should use the same mode as your VoIP service provider. The choices are:</p> <ul style="list-style-type: none"> • rfc2833 - Follow the RFC 2833 standard and send the DTMF tones in RTP packets. • inband - Send the DTMF tones in the voice data stream. This works best when you are using a codec that does not use compression (like G.711). Codecs that use compression (like G.729) can distort the tones. • info - Send the DTMF tones in SIP messages.
Caller ID	Select this if you want to send identification when you make VoIP phone calls. Clear this if you do not want to send identification.
Authentication	
Username	Type the SIP user name associated with this extension. The IP phone registering with the X6004 must provide this for authentication.
Password	Type the SIP password associated with this extension. The IP phone registering with the X6004 must provide this for authentication.
Codec Setting	<p>Select the type of voice coder/decoder (codec) that you want this extension to use when communicating with the X6004. See Section 14.1.1 on page 126 for more information on voice codecs. The following codecs (shown in highest quality to lowest quality order) are supported by the X6004:</p> <ul style="list-style-type: none"> • G.711 a-law (typically used in Europe) • G.711 μ-law (typically used in North America and Japan) • G.729 • G.723.1 - you must activate support for this codec in the Configuration > PBX > Server Configuration > SIP Server screen. • G.726 <p>When two SIP devices start a SIP session, they must agree on a codec. If these SIP extensions are assigned to videophones, you must specify the video codecs used for video calls. The X6004 allows the following video codecs to passthrough:</p> <ul style="list-style-type: none"> • H.261 • H.263 • H.264 • MP4 <p>See Section 14.1.2 on page 127 for more information on video codecs.</p>
Codec Pool	This column indicates the codec types not used for these extensions. You can add a codec type to be used for these extensions by highlighting it and clicking the Right button.
Codec List	This column indicates the codec types used by these extensions. You can organize the priority of the codecs by highlighting it and clicking the Up or Down buttons to move the codec higher or lower in priority. The SIP extensions attempt to use the higher priority codecs first and try the lower priority codecs next. You can remove a codec type from being used from these extension by highlighting it and clicking the Left button.
Apply	Click this to save your changes.
Cancel	Click this to set every field in this screen to its last-saved value.

18.5 Auto-Attendant for SIP Trunks

Use this screen to select which auto-attendant should be used with this outbound line group. See [Chapter 19 on page 175](#) for information on configuring auto-attendant. You can also configure your DID (Direct Inward Dialing) settings. Click the **Auto-Attendant** icon in the in the **SIP Trunk** section of the **Outbound Group** configuration screen to view the screen as shown.

Figure 148 AA for SIP Trunks

Each field is described in the following table.

Table 68 AA for SIP Trunks

LABEL	DESCRIPTION
Auto-Attendant	
DID	Select Enable to have the X6004 check if the numbers dialed by outside callers to the X6004 match any of the extensions on your network. The X6004 forwards calls that match Dialed-In-Digits rules you configure in the DID Mapping screen to the extensions on your network. Click DID Mapping to configure Direct Inward Dialing rules. Select Disable to allow all incoming calls to be handled by the Auto-Attendant .
Apply AA	Select the Auto-Attendant you want to use when calls come in on this outbound line group. If you want to forward all incoming calls on this SIP trunk to be forwarded to a fax machine located at a specific extension, then select FAX .
Extension Number for Fax	This field is only available if you select FAX in the Apply AA field. Type the extension of the Fax machine you want to forward calls to.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to go to the Outbound Group screen without saving your changes.

18.5.1 Configuring Direct Inward Dialing Settings

Use this screen to setup Direct Inward Dialing (DID) mappings for the X6004. Click the **DID Mapping** button in the **Auto-Attendant** screen to view the screen as shown.

Figure 149 DID Mapping Setting

Each field is described in the following table.

Table 69 DID Mapping Setting

LABEL	DESCRIPTION
Partial Mapping	Select Enable to have the X6004 inspect either the first or the last digits of incoming telephone numbers and to check them against the extensions configured on the X6004. Select Disable to have the X6004 inspect the entire telephone number of incoming calls against the extensions configured on the X6004.
Match Part	Specify whether to inspect the first or the last set of digits of incoming calls and compare them against the extensions on the X6004.
Match Digit(s)	Specify how many digits the X6004 should inspect and compare against the extensions configured on the X6004.
Apply	Click this to save your changes.
Cancel	Click this to go to the Auto-Attendant screen without saving your changes.

18.6 Trusted Peer Configuration

Trusted peers refer to connections to another SIP server (for example another X6004) that has configured your X6004 as a trusted peer. Your organization may want to use trusted peer connections between remote branch offices.

18.6.1 Add/Edit Trusted Peer

The screens for editing or adding trusted peers on the X6004 contain the same fields. Only the screen used to add a trusted peer is shown below. Click the **Add** (or **Edit**) icon in the **Trusted Peer** section of the **Outbound Line Group** configuration screen to view the screen as shown.

Figure 150 Add/Edit Trusted Peer

Each field is described in the following table.

Table 70 Add/Edit Trusted Peer

LABEL	DESCRIPTION
Machine ID	Select the ID of the X6004 on which you want to configure the trusted peer. This is an internal name (not configurable) of the X6004. Only one choice is shown if you have not configured ZyStack. This field is not available when editing a Trusted Peer configuration.
Group Name	Type the name of this trusted peer connection. You can use alpha-numeric characters and spaces are not allowed.
Description	Type the description for this trusted peer connection. You can use alpha-numeric characters and spaces are allowed.
Apply	Click this to save your changes.
Back to Outbound Group	Click this to go to the Outbound Line Group screen without saving your changes.

18.6.2 Trusted Peer Configuration

Use this screen to configure a trusted peer. Click the **Advanced** icon in the **Trusted Peer** section of the **Outbound Line Group** configuration screen to view the screen as shown.

Figure 151 Trusted Peer Configuration

Each field is described in the following table.

Table 71 Trusted Peer Configuration

LABEL	DESCRIPTION
SIP Server Address	Enter the IP address or domain name of the trusted peer. You can use up to 95 printable ASCII characters. It does not matter whether the SIP server is a proxy, redirect or register server.
SIP Server Port	Enter the SIP server's listening port number. Keep the default value, if you are not sure of this value.
SIP Service Domain	Enter the SIP service domain name. In the full SIP URI, this is the part after the @ symbol. You can use up to 127 printable ASCII Extended set characters.

Table 71 Trusted Peer Configuration

LABEL	DESCRIPTION
DTMF Mode	<p>Control how the X6004 handles the tones that the IP phones on your network make when they push their buttons. One use of the tones is to distinguish between numbers when trying to dial a PSTN phone number. You should use the same mode as your trusted peer. The choices are:</p> <ul style="list-style-type: none"> • rfc2833 - Follow the RFC 2833 standard and send the DTMF tones in RTP packets. • inband - Send the DTMF tones in the voice data stream. This works best when you are using a codec that does not use compression (like G.711). Codecs that use compression (like G.729) can distort the tones. • info - Send the DTMF tones in SIP messages.
Codec Setting	<p>Select the type of voice coder/decoder (codec) that you want to use when communicating with the trusted peer. See Section 14.1.1 on page 126 for more information on voice codecs. The following codecs (shown in highest quality to lowest quality order) are supported by the X6004:</p> <ul style="list-style-type: none"> • G.711A (typically used in Europe) • G.711μ (typically used in North America and Japan) • G.729A • G.723.1 - you must activate support for this codec in the Configuration > PBX > Server Configuration > SIP Server screen. • G.726 <p>When two SIP devices start a SIP session, they must agree on a codec. If the trusted peer uses videophones, you must specify the video codecs used for video calls. The X6004 allows the following video codecs to passthrough:</p> <ul style="list-style-type: none"> • H.261 • H.263 • H.264 <p>See Section 14.1.2 on page 127 for more information on video codecs.</p>
Codec Pool	<p>This column indicates the codec types not used for this trusted peer connection. You can add a codec type to be used for these extensions by highlighting it and hitting the Right button.</p>
Codec List	<p>This column indicates the codec types used for this trusted peer connection. You can organize the priority of the codecs by highlighting it and clicking the Up or Down buttons to move the codec higher or lower in priority. The SIP extensions attempt to use the higher priority codecs first and try the lower priority codecs next. You can remove a codec type from being used from these extension by highlighting it and hitting the Left button.</p>
Apply	<p>Click this to save your changes and to apply them to the X6004.</p>
Cancel	<p>Click this to set every field in this screen to its last-saved value.</p>

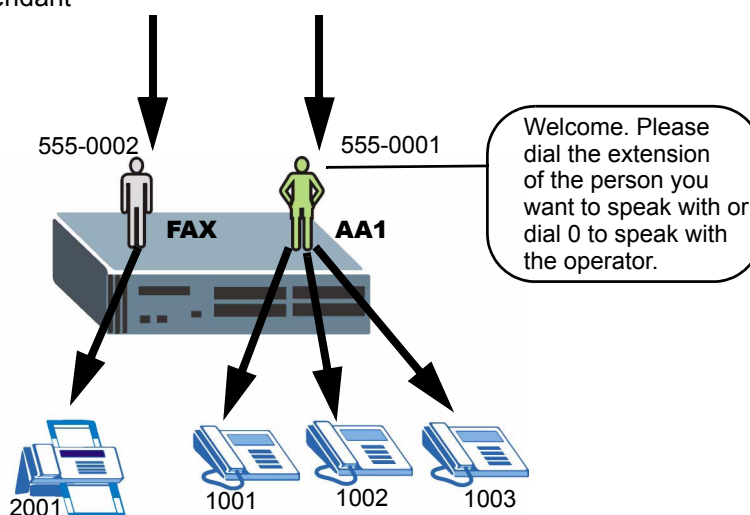
Auto-Attendant

This chapter shows you how to configure auto-attendant on the X6004.

19.1 Auto-Attendant Overview

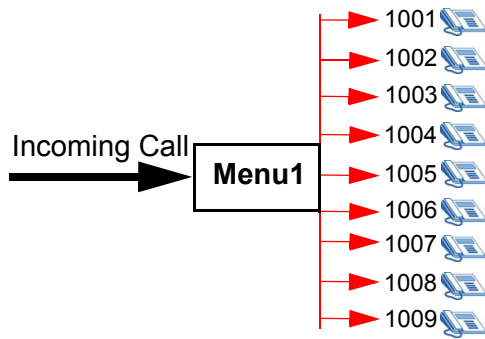
An auto-attendant is software which acts as an automatic switchboard operator. auto-attendants help route incoming calls to their proper extension. An auto-attendant is assigned to each outbound line group and it services incoming calls on those lines. If your organization has two outbound line groups, each with a specific telephone number for incoming calls, then you can assign a different auto-attendant for each incoming line. Assign one auto-attendant for general calls to your organization (for example, **AA1**) and one auto-attendant (for example **FAX**) for direct routing to a FAX machine.

Figure 152 Auto-Attendant

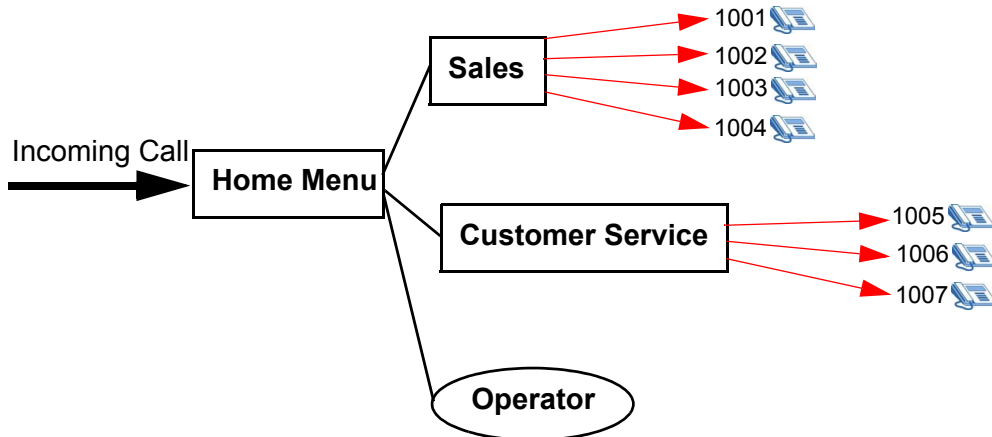


19.2 Auto-Attendant Structure

The X6004 comes with a default auto-attendant. The default auto-attendant simply prompts callers to enter the extension they wish to reach. There is only one time when a caller has to make a decision. The following figure shows the default auto-attendant structure.

Figure 153 Auto-Attendant Default Structure

You can configure a more complex auto-attendant structure to fit your organization's needs. An auto-attendant can contain several more complex menus that can guide an incoming call to a specific extension or a group of extensions. In the following example, an incoming caller is prompted to specify whether they want to talk to a sales representative, customer service representative or the operator. Once the caller reaches the **Sales** menu, the auto-attendant can prompt them to specify which product they are interested in. The caller then dials a number to reach the appropriate sales representative.

Figure 154 Auto-Attendant Custom Structure

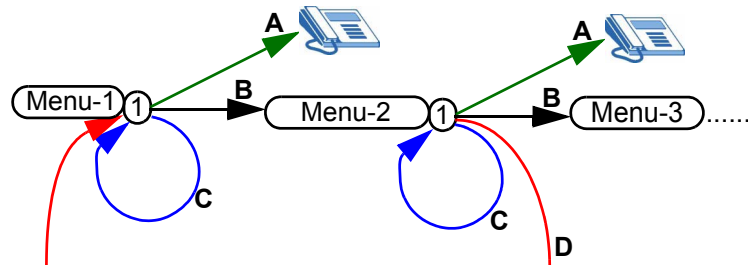
19.2.1 Configuring Menus

Configuring an auto-attendant requires you to set up menus. In [Figure 154 on page 176](#) there are three menus. The **Home Menu** and two sub menus: **Sales** and **Customer Service**. Each menu should have an accompanying audio file which informs the callers of their options. In each menu you can allow or disallow the dialing of extensions. You can also assign the following options to each menu based on the action performed by the caller. Each option is followed by example content for the accompanying audio file.

- Direct a call to an extension. “Dial 1 to reach the operator.”
- Direct a caller to the next menu. “Dial 2 to reach the sales department.”
- Allow the caller to listen to the current menu again. “Dial 3 to listen to this menu again.”
- Allow the caller to go back to the previous menu. “Dial 4 to go back to the previous menu.” (Not available for the first menu.)

The caller dials the number specified in the prompt to navigate through the auto-attendant's menus. When configuring auto-attendant, you must choose a number that the caller should dial and an associated function for that option. The following example shows the options you can assign when the caller dials 1 as he or she moves through your customized auto-attendant.

Figure 155 Auto-Attendant Menus



When a caller dials **1** in **Menu-1**, you can direct them to an extension (**A**), move them to the next menu (**B**) or allow them to hear the menu again (**C**). The same options are available in **Menu-2** with the addition of going back to **Menu-1** (**D**).

19.3 Auto-Attendant Audio Files

This section describes how to record the prompts that callers hear when they hear the auto-attendant menus. The audio files you record must meet the following criteria:

- G.711 format voice file (*.wav), μ -law 8-bit mono mode.
- Size limit of a single auto-attendant message cannot exceed 600 kb.
- Size limit of all auto-attendant voice files is 10 Mb per X6004 (or per ZyStack).

19.3.1 Recording Auto-Attendant Audio Files

Follow the steps in this section to record audio files for use by auto-attendant.



The example shown here uses the components available in the Microsoft Windows 2000 operating system to create the audio files. Use this section as a guideline only.

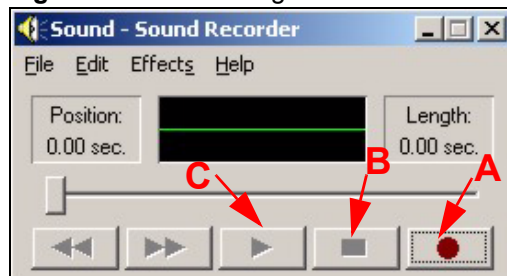


Make sure you have a microphone connected to your computer or that your system has an internal microphone (and that it is enabled).

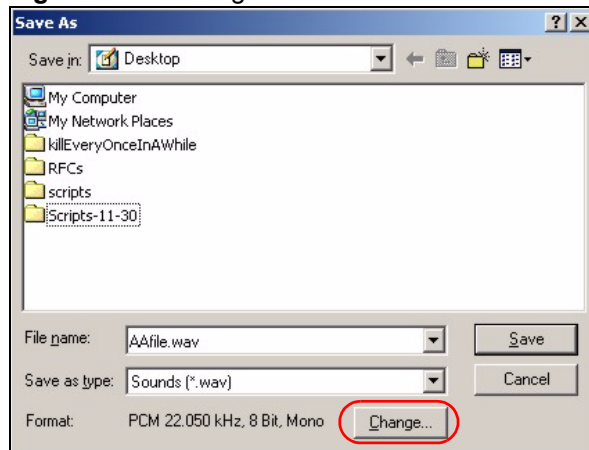
- 1 Open your sound recording software (**Sound Recorder** on Windows 2000). From your desktop, click **Start** > **Programs** > **Accessories** > **Entertainment** > **Sound Recorder**.

Figure 156 Sound Recorder

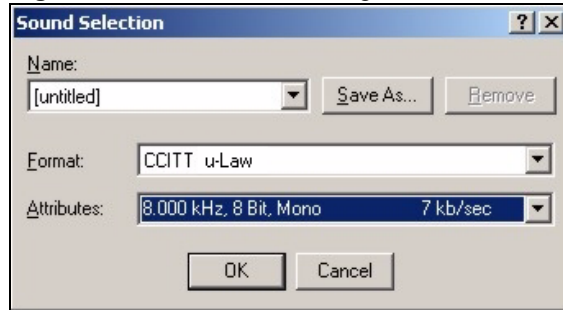
- 2 Record your audio file. When you are ready to record, press the **Record** button (A). When you are finished recording, press the **Stop** button (B). Press the **Play** button (C) to review your recording.

Figure 157 Recording Audio

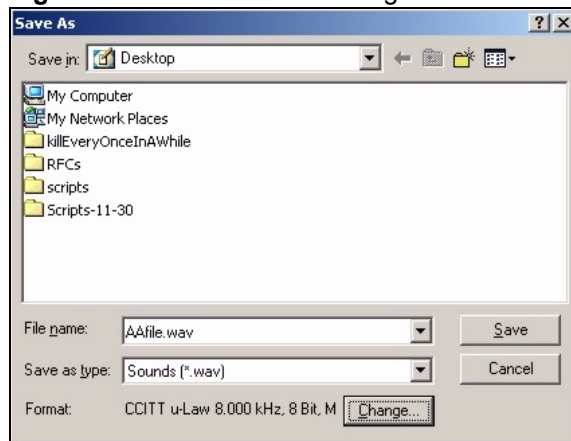
- 3 Save your audio file. In **Sound Recorder**, press **File > Save As**. Type a name for the audio file in the **File name:** field and then click **Change** to make sure that the file is saved in correct format.

Figure 158 Saving Audio Files

- 4 Specify the file format. In the **Sound Selection** window. Choose **CCITT μ -Law** in the **Format** field. Next, select the playback sound quality by choosing the frequency of the playback audio file. Higher frequency results in better sound but larger file size. Typically the setting **8.000 kHz, 8 Bit, Mono 7 kb/sec** is sufficient for auto-attendant recordings. Press **OK** when you are done.

Figure 159 Audio File Settings







- 5 Confirm your settings. Specify a location for the audio file by browsing to a suitable location on your file system. Click **Save** when you are finished.

Figure 160 Confirm File Settings

19.4 Auto-Attendant Management

Use this screen to view, add, edit or delete auto-attendants from the X6004. To access this screen, click **Configuration > PBX > Outbound Line Management > Auto-Attendant**.

Figure 161 Configuration > PBX > Outbound Line Management > Auto-Attendant

Auto-Attendant		
Auto-Attendant List		
Name	Description	
AA1	AA1	  
AA2	AA2	  

Each field is described in the following table.

Table 72 Configuration > PBX > Outbound Line Management > Auto-Attendant

LABEL	DESCRIPTION
Auto-Attendant List	
Name	This field displays the name assigned to an Auto-Attendant

Table 72 Configuration > PBX > Outbound Line Management > Auto-Attendant

LABEL	DESCRIPTION
Description	This field displays the description for an Auto-Attendant.
Add, Advanced, Edit, Delete	Click: <ul style="list-style-type: none"> • Add - to create a new Auto-Attendant. • Advanced - to configure an Auto-Attendant. • Edit - to change the name or description of an Auto-Attendant. • Delete - remove an existing Auto-Attendant.

19.4.1 Add/Edit Auto-Attendant

Use this screen to add or edit an auto-attendant. To access this screen, click the **Add** or **Edit** icon in the **Configuration > PBX > Outbound Line Management > Auto-Attendant** screen to view the screen as shown.



Only the **Add Auto-Attendant** screen is shown. In the **Edit Auto-Attendant** screen, the field names change from **Add** to **Edit**.

Figure 162 Add/Edit Auto-Attendant

Each field is described in the following table.

Table 73 Add/Edit Auto-Attendant

LABEL	DESCRIPTION
Name	Type a name for this Auto-Attendant. You can use alphanumeric characters as well as the underscore "_". Spaces are not allowed.
Description	Type a description for this Auto-Attendant. You can use alphanumeric characters as well as the underscore "_". Spaces are allowed.
Add/Edit	Click Add to save your changes.
Cancel	Click Cancel to go back to the previous screen without saving your changes.

19.4.2 Auto-Attendant Menu Settings

Use this screen to edit auto-attendant menu settings. Click the **Advanced** icon in the **Configuration > PBX > Outbound Line Management > Auto-Attendant** screen to view a screen as shown next.



Only the screen for the initial auto-attendant menu is shown. In the sub menu screens, some of the fields are not available.

Figure 163 Auto-Attendant Menu Settings

Key	Description	Action	Extension
1	111	Forward to next menu	Next Menu
3	333	Forward to an extension	4444
31	22	Forward to an extension	111

Each field is described in the following table.

Table 74 Auto-Attendant Menu Settings

LABEL	DESCRIPTION
Auto-Attendant (Office Hour) [Auto-Attendant Name]	This field identifies which auto-attendant settings you are configuring.
Audio File Upload	Enter the location of the file you want to upload, or click Browse... to find it.
Browse	Click this to find the file you want to upload.
Upload	Click this to upload an audio file for this menu of auto-attendant.
Audio File State	This field displays Uploaded if an audio file has been uploaded for this menu. If no audio file has been uploaded for this menu, it displays No audio file! .
Playback	Click Playback to play the audio file uploaded for this menu. The file is played by the default media player installed on your computer.
Dial Extension Number	Specify whether a caller can dial an extension number directly from this menu.
Forward to a specific extension directly (Extension)	<p>If you want this auto-attendant to forward calls directly to a specific extension without playing any audio file, then select this option and type the extension you want to forward calls to.</p> <p>This option can be used for a fax line or direct line to a specific extension.</p> <p>Note: This field is only available for the initial auto-attendant menu.</p>
Options	This section displays the actions configured for this auto-attendant menu.
Key	This field displays the digits a caller must dial to perform an action.
Description	This field displays the description for this action.
Action	This field displays the function of an action.

Table 74 Auto-Attendant Menu Settings (continued)

LABEL	DESCRIPTION
Extension	This field displays either the extension that this call is forwarded to or it displays Next Menu , if the action for this auto-attendant option is to Forward to next menu . Click Next Menu to configure the settings for a sub menu.
Add/Edit/Delete	Click: <ul style="list-style-type: none"> • Add to create a new option for this auto-attendant menu. • Edit to change the settings for an auto-attendant option. • Delete to remove this option from this Menu.
Apply	Click this to save your changes.
Cancel	Click this to go back to the previous screen without saving your changes.

19.4.3 Add/Edit Auto-Attendant Option

Use this screen to configure an option for an auto-attendant menu. To access this screen, click the **Add** or **Edit** icon in the menu screen of an auto-attendant.



Only the **Add Option** screen is shown. In the **Edit Option** screen, some of the labels change from **Add** to **Edit**.

Figure 164 Add/Edit Auto-Attendant Option

Each field is described in the following table.

Table 75 Add/Edit Auto-Attendant Option

LABEL	DESCRIPTION
Key	Type the digit(s) a caller should dial to execute this option. You can enter up to 5 digits.
Description	Type a description for this auto-attendant option. You can use alphanumeric characters and spaces are allowed. You can also leave this field blank.
Action	Specify the action for this auto-attendant option. The choices are: <ul style="list-style-type: none"> • Forward to an extension - to forward a call to a specific extension. • Forward to next menu - to forward a call to the next menu. • Repeat menu - to replay the auto-attendant audio file for this menu. • Return previous menu - to go back to the previous menu for this auto-attendant menu. This option is not available in the initial auto-attendant menu.

Table 75 Add/Edit Auto-Attendant Option

LABEL	DESCRIPTION
Extension	Specify the extension you want to forward this call to. This field is only applicable, if you select Forward to an extension in the Action field.
Apply	Click this to save your changes.
Cancel	Click this to go back to the previous screen without saving your changes.

19.4.4 Auto-Attendant Night Service Settings

Use this screen to configure **Night Service** settings for this auto-attendant. You only need to configure this screen, if you want the auto-attendant to perform different actions outside of regular office hours. Click the **Night Service** tab in the **Advanced** screen of an auto-attendant to view the screen as shown.



Only the screen for the initial auto-attendant menu is shown. In the sub-menu screens, some of the fields are not available.

Figure 165 Auto-Attendant Menu Settings - Night Service

Auto-Attendant **Night Service**

Auto-Attendant (Office Hour) [NewAA]

Night Service ☐ Enable ☒ Disable

Audio File Upload

Audio File State No audio file!

Dial Extension Number ☒ Enable ☐ Disable

☐ Forward to a specific extension directly (Extension)

Options

Action	Description	Action	Extension	
1	111	Forward to next menu	Next Menu	
3	333	Forward to an extension	4444	
31	22	Forward to an extension	111	

Each field is described in the following table.

Table 76 Auto-Attendant Menu Settings - Night Service

LABEL	DESCRIPTION
Auto-Attendant (Night Service) [Auto-Attendant Name]	This field identifies which auto-attendant settings you are configuring.
Night Service	Choose Enable to specify that you want to have separate setting for this auto-attendant during the Night Service hours. See Chapter 13 on page 123 for more information on office hours. Choose Disable to use one set of auto-attendant settings only (Office Hour settings).
Audio File Upload	Enter the location of the file you want to upload, or click Browse... to find it.
Browse	Click this to find the file you want to upload.
Upload	Click this to upload an audio file for this menu of auto-attendant.
Audio File State	This field displays Uploaded if an audio file has been uploaded for this menu. If no audio file has been uploaded for this menu, it displays No audio file! .
Playback	Click Playback to play the audio file uploaded for this menu. The file is played by the default media player installed on your computer.
Dial Extension Number	Specify whether a caller can dial an extension number directly from this menu.
Forward to a specific extension directly (Extension)	If you want this auto-attendant to forward calls directly to a specific extension without playing any audio file, then select this option and type the extension you want to forward calls to. This option can be used for a fax line or direct line to a specific extension. Note: This field is only available for the initial auto-attendant menu.
Options	This section displays the actions configured for this auto-attendant menu.
Action	This field displays the digits a caller must dial to perform an action.
Description	This field displays the description for this action.
Action	This field displays the function of an action.
Extension	This field displays either the extension that this call is forwarded to or it displays Next Menu , if the action for this auto-attendant option is to Forward to next menu . Click Next Menu to configure the settings for a sub menu.
Add/Edit/Delete	Click: <ul style="list-style-type: none"> • Add to create a new option for this auto-attendant menu. • Edit to change the settings for an auto-attendant option. • Delete to remove this option from this Menu.
Apply	Click this to save your changes.
Cancel	Click this to go back to the previous screen without applying any unsaved changes.

This chapter shows you how to configure dialing rules, also referred to as LCR (Least Cost Routing) on the X6004.

20.1 LCR Overview

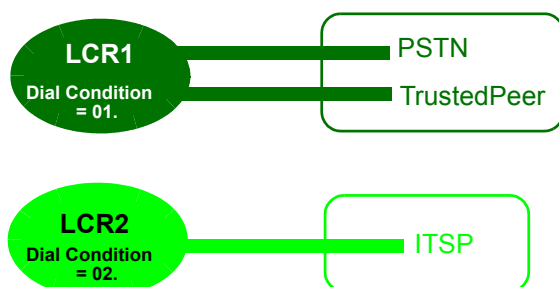
LCRs are made up of two components. The first part of an LCR is a set of 1 or more outbound line groups (see [Chapter 18 on page 163](#)). The second part of an LCR is a dial condition, or a pattern of digits that distinguish each individual LCR.

LCRs are used to give calling rights to authority groups, trusted SIP peers as well as outbound line groups. This is done via group management, see [Chapter 21 on page 191](#). Once you create an LCR, you can associate it with:

- **Authority Groups** - give all the extensions contained in an authority group the right to use the outbound line groups configured in the LCR.
- **Trusted SIP Peers** - give the telephones connected to the SIP peer the right to call the X6004 and then dial out from the X6004 using the outbound line groups configured in the LCR.
- **Outbound Line Groups** - give anyone calling in via the associated outbound line group the right to use the X6004 to make calls via the outbound line groups configured in the LCR.

The following figure shows an example of two LCRs. **LCR1** is composed of outbound line groups **PSTN** and **TrustedPeer** along with the dial condition **01.** (the period (.) is part of the dial condition). **LCR2** is composed of outbound line group **ITSP** along with the dial condition **02.** When a user calls “021234” the call is routed through the outbound line group defined in **LCR2**.

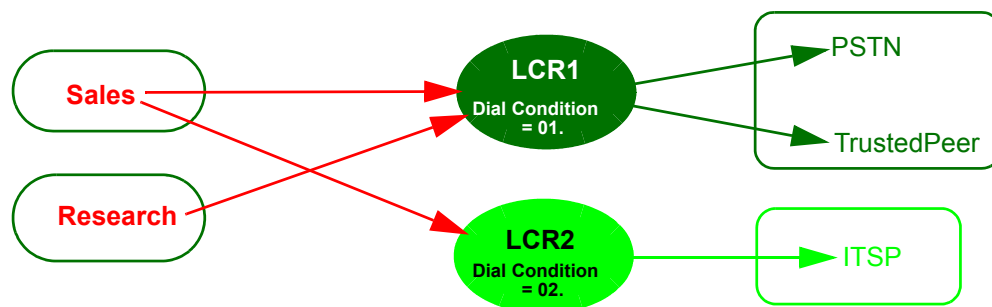
Figure 166 LCR Components Example



When an LCR contains more than one outbound line group, as in the **LCR1** example, the administrator can prioritize the outbound line groups in the LCR. When a call is made using an LCR with multiple outbound line groups, the X6004 tries to use the higher priority outbound line group first and, if the line is not available, then it tries a lower priority outbound line group.

The following figure shows a possible assignment of LCRs to authority groups. In our example, the **Sales** authority group has been associated with both **LCR1** and **LCR2**, so extensions that are part of **Sales** can use any outbound line group they choose. The second authority group - **Research**, only has **LCR1** assigned to it, so extensions that are part of **Research** can not use outbound line group **ITSP**.

Figure 167 LCR Components Example



20.2 LCR List

Use this screen to view outbound dialing rules (LCRs) configured on the X6004. To access this screen, click **Configuration > PBX > Outbound Line Management > LCR**.

Figure 168 Configuration > PBX > Outbound Line Management > LCR

LCR List			
Delete		:Add :Edit :Delete	
<input type="checkbox"/>	LCR Name	Description	
<input type="checkbox"/>	ezout	easy to call out	
<input type="checkbox"/>	local_call	local call LCR	
<input type="checkbox"/>	long_distance_call	long distance call LCR	
<input type="checkbox"/>	international_call	international call LCR	
<input type="checkbox"/>	OutRule1	Rule for PSTN	
<input type="checkbox"/>	SIP1	SIP1	
Delete			

Each field is described in the following table.

Table 77 Configuration > PBX > Outbound Line Management > LCR

LABEL	DESCRIPTION
Delete	Select the LCRs that you want to remove in the Delete column and then click the Delete button.
LCR Name	This is the name of the LCR.

Table 77 Configuration > PBX > Outbound Line Management > LCR

LABEL	DESCRIPTION
Description	This text describes the LCR.
Add/Edit/Delete	Click Add to create a new LCR. Click Edit to change the settings of an existing LCR. Click Delete to remove an existing LCR.

20.2.1 LCR Configuration

Use this screen to choose the outbound line groups and create dialing conditions for an LCR. To access this screen, click the **Add** or **Edit** icon in the **Dial Condition List** section of the **LCR** screen to view the screen as shown.



Only the **Add LCR** screen is shown. In the **Edit LCR** screen, some of the fields are read-only.



Before you can configure any dial conditions for an LCR, you must first configure the **LCR Data** section of this screen and click **Apply**.

Figure 169 LCR Configuration

Each field is described in the following table.

Table 78 LCR Configuration

LABEL	DESCRIPTION
LCR Data	
LCR Name	Type a short name to identify this outbound dialing rule (LCR). You can use letters “a-z”, “A-Z”, numbers “0-9” and the underscore “_” character. Spaces are not allowed.
Description	Type a short description for this outbound dialing rule (LCR). You can use printable ASCII characters; spaces are allowed.
Max Call Time	Leave this field blank, if you don’t want to limit the duration of outgoing calls that use this outbound dialing rule (LCR). Alternatively, enter the number of seconds (1-99999) to which you want to limit the duration of outgoing calls that use this outbound dialing rule (LCR).
Outbound Line Group	Use this section to add or remove outbound line groups from this outbound dialing rule (LCR). <ul style="list-style-type: none"> Add an outbound line group to this LCR: Highlight an outbound line group in the Pool column by clicking on it and then click the Right button to move it to the Selected column. Remove an outbound line group from this LCR: Highlight an outbound line group in the Selected column by clicking on it and then click the Left button to move it to the Pool column. <p>If the LCR contains multiple outbound line groups, you can use the Up and Down buttons to specify the priority of the outbound line groups.</p> <ul style="list-style-type: none"> Highlight an outbound line group in the Selected column by clicking on it and then click the Up button to raise its priority. Highlight an outbound line group in the Selected column by clicking on it and then click the Down button to lower its priority.
Apply	Click this to save your changes.
Cancel	Click this to go back to the LCR List screen without saving changes.
Dial Condition List	
Delete	Select the dial conditions that you want to remove in the Delete column and then click the Delete button.
Dial Condition	This field displays the dial conditions (string of digits) that are used by this outbound dialing rule (LCR).
Add/Edit/Delete	Click Add to create a new dial condition for this outbound dialing rule (LCR). Click Edit to change the settings of an existing dial condition for this outbound dialing rule (LCR). Click Delete to remove an existing dial condition from this outbound dialing rule (LCR).

20.2.2 Add/Edit LCR Dial Condition

Use this screen to set up a dialing condition for an LCR. To access this screen, click the **Add** or **Edit** icon in the **Dial Condition List** section of the **LCR** screen you are configuring to view a screen as shown.



Only the **Add Dial Condition** screen is shown. In the **Edit Dial Condition** screen, some of the fields are read-only.



When creating a new LCR, you must first configure the **LCR Data** portion of the LCR configuration screen and press Apply before you can add a dial condition.

Figure 170 LCR: Dial Condition

Each field is described in the following table.

Table 79 LCR: Dial Condition

LABEL	DESCRIPTION
Dial Condition	
LCR Name	This field displays the name of the outbound dialing rule that this dialing condition applies to.
Dial Condition	<p>Create the criteria for using this outbound dialing rule. The criteria can be</p> <ul style="list-style-type: none"> a specific number - for example "55555555"; in this case the number dialed by users must match this string exactly. any number starting with a specified pattern of digits - for example "0.", "555.", "011." and so on; in this case the number dialed must match the digits before the period "." and it doesn't matter what follows. For example dialing "0222-2222" matches the dialing condition "0." <p>You can also specify a range for digits within a dial condition. You can:</p> <ul style="list-style-type: none"> use the letters X, Z, N to specify a range of numbers to match. X represents the range 0-9, Z represents the range 1-9 and N represents the range 2-9. use brackets to specify an allowed range for a dialed digit. For example [0-8] or [0-4, 6-9], in the second example 5 is not allowed. <p>Use the Right button to test if the dial condition is in acceptable format.</p> <p>Note: You should make sure to create unique dial conditions for each LCR. The X6004 is not able to distinguish between LCRs if they have the same dial condition.</p>
Number Pattern Test	<p>This field allows you to test whether a number dialed from one of the extensions meets the criteria specified in the Dial Condition field.</p> <p>Type a number you want to test and click the Right button. An O appears, if the number you typed matches the dial condition. An X appears, if the number you typed does not match the dial condition.</p>
Dial Number Viewer	This field displays the phone number sent from the X6004 to this outbound line group. You must click on an outbound line group in the Channel column of this screen to view the number sent from the X6004 to the outside line.

Table 79 LCR: Dial Condition

LABEL	DESCRIPTION
Channel	This column identifies the outbound line groups for this outbound dialing rule (LCR).
Offset	Specify how many initial digits of the dialed number should not be included in the number going out of the X6004.
Length	Specify whether the number dialed should be limited in length. If you set a limit, the numbers which extend beyond the limit will be cut off by the IPPBX.
Prefix	Specify a number which should be appended to the beginning of the dialed number before it is sent out from the X6004.
Postfix	Specify a number which should be appended to the end of the dialed number before it is sent out from the X6004.
Apply	Click this to save your changes.
Cancel	Click this to set every field in this screen to its last-saved value.

Group Management

This chapter shows you how to manage authority groups and outbound line groups on the X6004.

21.1 Group Management Overview

Group management allows you to control the types of calls made via the X6004. You can manage the types of calls extensions within authority groups can make, as well as the types of calls that callers from outside your organization can complete via the X6004. You grant calling rights by creating associations or links between the various logical entities configured on the X6004.

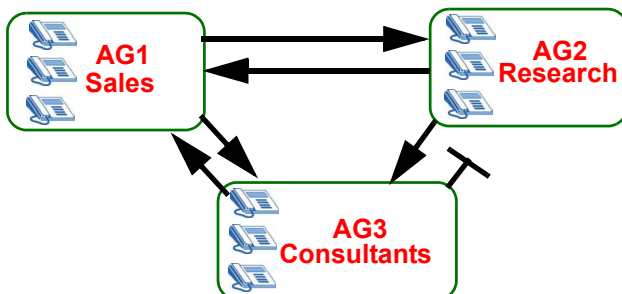
The following sections give an overview of granting calling rights to authority groups (see [Section 21.1.1 on page 191](#)), followed by granting calling rights to outbound line groups (see [Section 21.1.2 on page 193](#)).

21.1.1 Managing Authority Groups

You control extensions within an authority group by associating (linking) authority groups with:

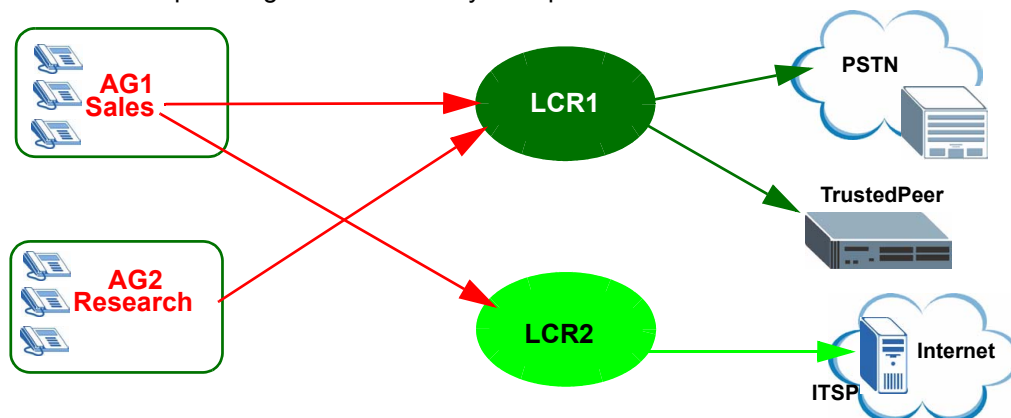
- **Authority Groups** - When you create an authority group it is by default linked to all other authority groups created on the X6004 and all the other authority groups are also linked to it. This means that any extension created on the X6004 can call any other extension created on the X6004 regardless if they are part of the same authority group. You can, however, stop extensions within one authority group from calling extensions in another authority group. An example is shown below. You have an organization with three authority groups (AG1-AG3). You can remove the link from one authority group (for example AG3) to another authority group (for example AG2) to stop extensions in AG3 from calling AG2.

Figure 171 Group Management - Authority Group to Authority Group



- **LCRs** (LCR is the outbound dialing rule) - When you create links from an authority group to an LCR, you allow the extensions in that authority group to make outbound calls via the outbound line groups configured in the LCR. The following figure shows **AG1**, which is an authority group for the sales department, associated with **LCR1** (this could be an LCR for calls via your local telephone service provider - **PSTN** and calls via a link to your branch office - **TrustedPeer**) and **LCR2** (this could be an LCR for long distance calls via your VoIP service provider **ITSP**). **AG2** is associated with **LCR1** only. In this case extensions belonging to **AG1** can make calls via all outbound line groups, whereas extensions in **AG2** are limited to calls to your local telephone company and your branch office.

Figure 172 Group Management - Authority Group to LCR



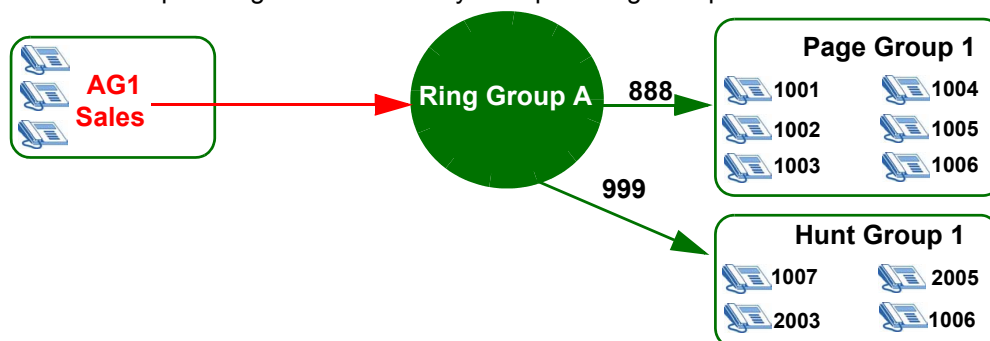
- **Ring Groups** - When you create links from an authority group to a ring group, you allow the extensions in that authority group to call the page group or the hunt group configured within the ring group. Ring groups consist of a set of extensions (that do not have to be from a single authority group). See [Chapter 15 on page 145](#) for more information on ring groups.

In the following example, authority group **Sales** is associated to **Ring Group A**. **Ring Group A** consists of:

- **Page Group 1**; allows you to call all the extensions within **Page Group 1** simply by dialing the page group number (**888**).
- **Hunt Group 1**; allows you to call extensions within **Hunt Group 1** based on the algorithm defined in the hunt group setup simply by dialing the hunt group number (**999**).

All the extensions in the authority group **Sales** can call **Page Group 1** or **Hunt Group 1**.

Figure 173 Group Management - Authority Group to Ring Group



21.1.2 Managing Outbound Line Groups

Outbound line groups include SIP Trunks, FXO Trunks and Trusted Peers as defined in [Chapter 18 on page 163](#). For management purposes the X6004 grants rights to calls coming in via these channels based on the outbound line group they are part of. You can manage incoming calls by associating (linking) outbound line groups with:

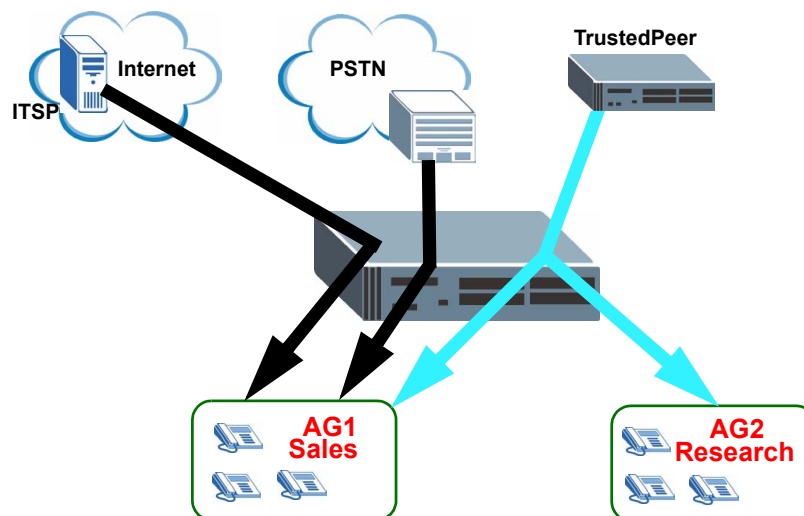
- **Authority Groups** - When you create an outbound line group it is by default linked to all authority groups created on the X6004. This means that calls coming in via this outbound line group are authorized to call any extension created on the X6004. You can remove the link from an outbound line group to an authority group to stop incoming calls from an outbound line group from going to a specific authority group.



You must also configure auto-attendant settings before calls coming in from outside lines can call the extensions created on the X6004. See [Chapter 19 on page 175](#).

The following example shows a configuration with three outbound line groups. **ITSP** represents a SIP trunk to your VoIP service provider. **PSTN** represents a link to your local traditional telephone service provider and **TrustedPeer** is a connection to your branch office. Incoming calls from **ITSP** and from **PSTN** are allowed to only reach extensions of your sales team (**AG1**). Calls coming in from **TrustedPeer** are allowed to reach the extensions of both the sales (**AG1**) and research (**AG2**) departments. This configuration is accomplished by removing the association to **AG2** from the **ITSP** and **PSTN** outbound line groups.

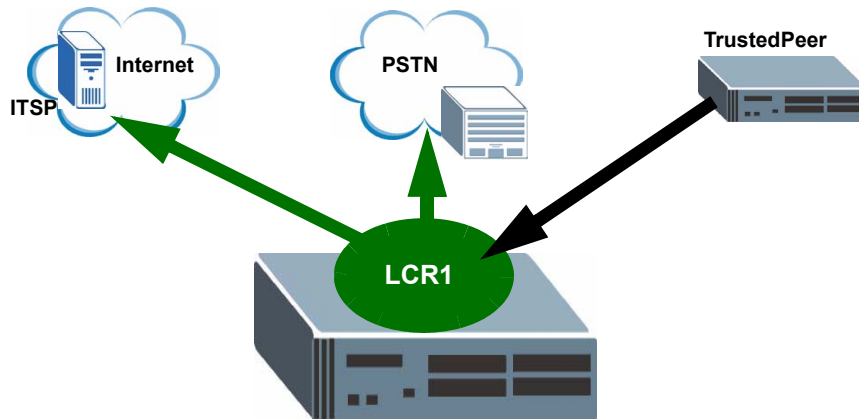
Figure 174 Group Management - Outbound Line Group to Authority Group



- **LCRs** (LCR is the outbound dialing rule) - When you create links from an outbound line group to an LCR, you allow incoming calls from that outbound line group to make outbound calls via the outbound line groups configured in the LCR. For example, someone calling from outside your organization can use the X6004 to forward their call to another outside line.

In the following example, outbound line group **TrustedPeer** is associated with **LCR1**. **LCR1** is comprised of two outbound line groups: a SIP trunk to your VoIP service provider - **ITSP** and a connection to your local traditional telephone company - **PSTN**. Calls coming in via the **TrustedPeer** connection can use the **ITSP** and **PSTN** connections to complete their calls.

Figure 175 Group Management - Outbound Line Group to LCR



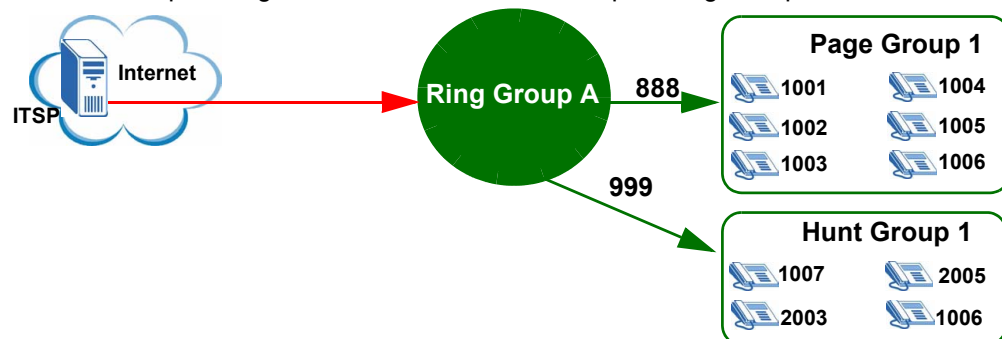
- **Ring Groups** - When you create links from an outbound line group to a ring group, you allow calls coming in via that outbound line group to call the page or hunt group configured within the ring group.

In the following example, outbound line group **Sales** is associated to **Ring Group A**. **Ring Group A** consists of:

- **Page Group 1**; allows you to call all the extensions within **Page Group 1** simply by dialing the page group number (**888**).
- **Hunt Group 1**; allows you to call extensions within **Hunt Group 1** based on the algorithm defined in the hunt group setup simply by dialing the hunt group number (**999**).

All calls coming in via the outbound line group **ITSP** can call **Page Group 1** or **Hunt Group 1**.





Figure 176 Group Management - Outbound Line Group to Ring Group



21.2 Group Management Screen

Use this screen to view and manage the associations for the authority and outbound line groups configured on the X6004. To access this screen, click **Configuration > PBX > Group Management**.

Figure 177 Configuration > PBX > Group Management

Group Management			
Authority Group			
Machine ID	Group Name	Description	Associations
IPPBX_001	default	Default Group For Extensions	
FXO Trunk			
Machine ID	Group Name	Description	Associations
IPPBX_001	FXO1	Outgoing Group for FXO1	
SIP Trunk			
Machine ID	Group Name	Description	Associations
IPPBX_001	SIP1	Outgoing Group for SIP1	
Trusted Peer			
Machine ID	Group Name	Description	Associations
IPPBX_001	Group1	Group1 Peers	

Each field is described in the following table.

Table 80 Configuration > PBX > Group Management

LABEL	DESCRIPTION
Authority Group / FXO Trunk / SIP Trunk / Trusted Peer	<p>These headings separate the group types you can manage on the X6004:</p> <ul style="list-style-type: none"> • Authority Group - These are the authority groups containing extensions on the X6004. • Outbound Group - These are outside lines via the FXO ports on the X6004. • SIP Trunk - These are outside lines to a SIP server at your VoIP service provider. • Trust Peer - These are outside lines to another SIP server (for example another X6004) that has configured your X6004 as a Trust Peer.
Machine ID	This field displays the ID of the X6004 on which a group is configured.
Group Name	This field displays the name of a group (authority group or an outbound line group).
Description	This field displays the description of this group.
Associations	Click the Advanced icon to configure links for an authority or an outbound line group.

21.2.1 Edit Group Management Associations

Use this screen to configure links from an authority group or an outbound line group to authority groups, LCRs or ring groups configured on the X6004. To access this screen, click the advanced icon next to the group you want to configure in the **Configuration > PBX > Group Management** screen.

Figure 178 Configuration > PBX > Group Management > Advanced

Group Management

Accessible Group List

Group Name default

Group Name	Description	Group Type	Associations
ezout	easy to call out	LCR	<input checked="" type="checkbox"/>
local_call	local call LCR	LCR	<input type="checkbox"/>
long_distance_call	long distance call LCR	LCR	<input type="checkbox"/>
international_call	international call LCR	LCR	<input type="checkbox"/>

Apply Cancel

Each field is described in the following table.

Table 81 Configuration > PBX > Group Management > Advanced

LABEL	DESCRIPTION
Accessible Group List	The table below shows which links you can create from the group (authority group or outbound line group) identified in the Group Name field above the table.
Group Name	This field displays the name of an authority group, LCR or ring group to which you can configure a link.
Description	This field displays the description of the group to which you can create a link.
Group Type	This field identifies whether you are creating a link to: Authority Group - another set of extensions on the X6004. LCR - an outbound dialing rule containing outbound line groups. Ring Group - a group of extensions in a page group, hunt group or both.
Associations	Select this checkbox to link a group you are configuring to another group. Clear this checkbox to remove a link between the group you are configuring and another group.
Apply	Click this to save your changes.
Cancel	Click this to go back to the previous screen.

Call Services

This chapter shows you how to configure and use call services on the X6004.

22.1 Call Services Overview

The following table summarizes call services available on the X6004:

Table 82 Call Services Summary

FEATURE	DESCRIPTION
Call Emergency	Configure emergency numbers which the X6004 treats with the highest priority. Even if all outbound lines from the X6004 are busy, the X6004 will drop an existing FXO channel and allow an emergency call to complete. See Section 22.2 on page 198 .
Meet-me Conference	Configure conference room extensions. Callers from within and outside your organization can join conference calls by dialing a conference room extension. See Section 22.3 on page 199 .
Music on Hold	Upload your choice of audio to play while callers are placed on hold. See Section 22.4 on page 202 .
Distinctive Ring	Configure different ring tones for incoming calls. This allows you to differentiate where the call is coming from (within or outside your organization). See Section 22.5 on page 202 .
Auto Callback	Configure the X6004 to automatically call an extension once it frees up (ends an existing conversation). This eliminates the need for you to keep trying to call a busy extension. See Section 22.6 on page 203 .
Call Parking	Configure the X6004 to allow users to put a call on hold at one extension and pick up the call from another extension in your organization. See Section 22.7 on page 204 .

22.2 Emergency Call Overview

The X6004 allows you to specify and give higher priority to emergency calls to the outside world. You can configure a list of emergency phone numbers, for example police or fire department, on the X6004. The X6004 recognizes when an emergency number is dialed and tries to send the call to the configured destination number. The X6004 tries to use FXO trunks for emergency calls. If all the lines on the X6004 are busy, the X6004 will free up a line by hanging up an existing FXO conversation and then pass the emergency call to the destination number.

22.2.1 Emergency Call Configuration

Use this screen to manage emergency call numbers on the X6004. Click **Configuration > PBX > Call Settings > Call Emergency** to view the following screen.

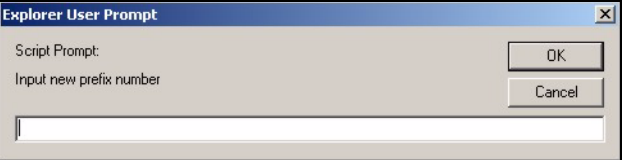

Figure 179 Emergency Call Configuration

The following table describes the labels in this screen.

Table 83 Emergency Call Configuration

LABEL	DESCRIPTION
Outbound Line List	Use this section to specify which outside line groups should be used for emergency calls.
Outbound Line Pool/Selected Outbound Line	Highlight an outside line group in the Outbound Line Pool column and click the right arrow to select this outside line group for emergency call use. Highlight an outside line group in the Selected Outbound Line column and click the left arrow to remove this outside line group from emergency call use.

Table 83 Emergency Call Configuration (continued)

LABEL	DESCRIPTION
Edit	<p>Highlight an outside channel and click the edit icon to add a prefix which should be appended to emergency calls when using this outside line.</p>  <p>The prefix is what allows callers to simply dial the well known emergency number for their region. For example, in the United States the emergency number is 911, so you want users to simply dial 911 in case of an emergency. Since extensions usually have to dial a prefix to dial out via the X6004, this might make it confusing for callers within your organization.</p> <p>Type the prefix number necessary to connect users to an emergency number by simply dialing the emergency number you configure in the Emergency Number section of this screen.</p>
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to set every field in this screen to its last-saved value.
Emergency Numbers	Use this section to add, edit or remove emergency numbers.
Delete	Select this checkbox and click Delete to remove this emergency number from the X6004.
Emergency Numbers	This column displays the emergency numbers currently configured on the X6004.
Add/Edit/Delete	<p>Use the Add icon to configure a new emergency number. A window opens up and prompts you to enter the emergency number.</p> <p>Use the Edit icon to change an existing emergency number. A window opens up and prompts you to change the emergency number.</p>  <p>Use the Delete icon to remove an existing emergency number from the X6004.</p>

22.3 Conference Calling Overview

The X6004 allows you to set up specific extension numbers which callers can dial to join a conference call. This type of extension is referred to as a conference room number. You can restrict the number of callers that can join the conference call. You can also specify a PIN (Personal Identification Number) for the conference room. Callers must enter the PIN before they can enter the conference room.

If you have multiple X6004s working together (ZyStack), then you can specify which one should hold the conference room. This allows you choose which X6004s resources are being used for the conference call. The resources used up include DSP channels and outside lines coming into your organization.

Callers within your organization simply call the conference room number to join the conference call. Callers from the outside dial the conference room number after they are prompted by auto-attendant to dial the extension they wish to call.

22.3.1 Conference Calling Configuration

Use this screen to manage conference calling on the X6004. Click **Configuration > PBX > Call Settings > Meet-me Conference** to view the following screen.

Figure 180 Conference Room List

The following table describes the labels in this screen.

Table 84 Conference Room List

LABEL	DESCRIPTION
DSP Resource	This section displays the DSP resources available for each X6004 in a ZyStack. It only displays one X6004 if you have not implemented ZyStacking.
Machine ID	This field displays the name of the X6004 in the ZyStack.
Conference	This field displays the number of DSP channels reserved for conference calls. You can reserve DSP channels in the Configuration > PBX > Server Configuration > DSP Management screen.
Share	This field displays the number of unassigned DSP channels. Unassigned DSP channel are shared by conference calls and calls via SIP trunks.
Conference Room List	This section allows you to view conference room details as well as add or delete conference rooms.
Delete	Select this checkbox and click Delete to remove this conference room from the X6004.
Room	This field displays the conference room number. This is the extension callers should dial to enter this conference room.
Machine ID	This is the system name of the X6004.
Number	This is the number of participants that can join this conference call at any one time.
Description	This field displays the description you enter to identify this conference room.
Add/Edit/Delete	Click the Add icon to create a new conference room. Click the Edit icon to change the settings of an existing conference room on the X6004. Click the Delete icon to remove an existing conference room from the X6004.

22.3.2 Conference Calling Edit and Add

Use this screen to configure a new conference room. Click the **Add** icon to see the screen as shown.



The screen for editing an existing conference room has the same fields as the screen shown below. You can access the **Conference Room Edit** screen by clicking the **Edit** icon in the **Conference Room List** screen.

Figure 181 Conference Room Add

The following table describes the labels in this screen.

Table 85 Conference Room Add

LABEL	DESCRIPTION
Conference Number	Enter the extension (4 to 7 digits in length) callers should dial to enter this conference room. If you are editing an existing conference room entry, this field is read-only.
Machine ID	Select the X6004 you want to use for this conference call. If you are editing an existing conference room entry, this field is read-only.
Max. Members	Specify the maximum number of participants for this conference room. The minimum number of participants for a conference call is three and the maximum number you can configure is 99. Once the maximum number of participants join this conference call, the conference room will be closed until an existing participant leaves the conference room. If you allow too many participants into a single conference room, you may use up all of the DSP resources on the X6004 and callers will not be able to make calls.
PIN Number	Type the numeric password callers need to enter to join a conference room. If this field is left blank, then callers can enter this conference room without entering a PIN.
Confirm PIN Number	Retype the PIN.
Description	Enter a brief description to identify this conference room.
Add/Apply	Click this to save your changes.
Cancel	Click this to set every field in this screen to its last-saved value.

22.4 Music on Hold Overview

The X6004 allows you to specify a music file to play when callers are placed on hold. This lets the callers know that they are still connected. Use the following guidelines for the music file:

Table 86 Music on Hold File Guidelines

SPECIFICATION	DESCRIPTION
Format	The music file must be a G.711 format audio file (*.wav), μ -law.
Size	The music file should be less than 100 Kb in size. The X6004 will play the file in a loop.

22.4.1 Music on Hold Management

Use this screen to upload an audio file to the X6004. This file is played when callers are placed on hold. You can also specify for the X6004 to play the default music file. Click **Configuration > PBX > Call Settings > Music on Hold** to view the following screen.

Figure 182 Music on Hold

The following table describes the labels in this screen.

Table 87 Music on Hold

LABEL	DESCRIPTION
Music on Hold Management	
Upload new music file:	Type in the location of the file you want to upload in this field or click Browse ... to find it.
Browse...	Click Browse... to find the .bin file you want to upload. Remember that you must decompress compressed (.zip) files before you can upload them.
Upload	Click Upload to begin the upload process.
Use Default	Click this to select the default music file to be played when callers are placed on hold.
Playback	Click Playback to play the uploaded audio file. The file is played by the default media player installed on your computer.

22.5 Distinctive Ring Configuration

The X6004 allows you to select different ring tones based on the origins of calls routed through the X6004.

Click **Configuration > PBX > Call Settings > Distinctive Ring** to configure the distinctive ring feature.

Figure 183 Distinctive Ring

The following table describes the labels in this screen.

Table 88 Distinctive Ring

LABEL	DESCRIPTION
Active	Select this to activate the distinctive ring feature.
Ring Tone	Select a ring tone and press Playback to listen to the ring tone on the computer that you are configuring the X6004.
Internal Call	Select the ring tone for internal calls (calls from one extension to another extension on the X6004).
SIP Trunk	Select the ring tone for calls coming in from the SIP trunk (for example your connection to the ITSP).
FXO	Select the ring tone for calls coming in from the FXO trunk (for example your connection to the PSTN).
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

22.6 Auto Callback Overview

The auto callback feature is used when a caller encounters a busy signal when dialing one of the extensions. The caller can then request the X6004 to automatically call both parties when both of the extensions are free.

Click **Configuration > PBX > Call Settings > Auto Callback** to configure the auto callback feature.

Figure 184 Auto Callback

The following table describes the labels in this screen.

Table 89 Auto Callback

LABEL	DESCRIPTION
Active	Select this to activate the auto callback feature.
Queue Size	Select a limit to the number of auto callback requests for the X6004.

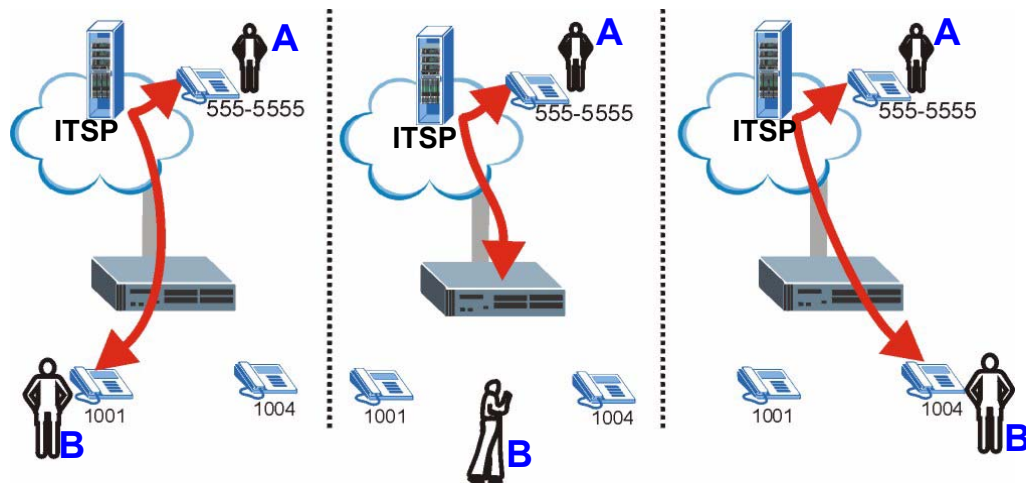
Table 89 Auto Callback (continued)

LABEL	DESCRIPTION
Apply	Click this to save your changes.
Reset	Click this to set every field in this screen to its last-saved value.

22.7 Call Parking Overview

Call parking is similar to placing a call on hold. The difference is that you can pick the call up again from another telephone extension in your organization.

The X6004 allows you to configure an extension for a call parking lot. The parking lot places a call in parking slot and informs you of the parking slot number that you can use to reconnect to the parked call. You can reconnect to the call from any extension within your organization. The following figure shows the progression of call parking.

Figure 185 Call Parking Overview

A step by step progression is the following

Table 90 Call Parking Progression

CALLER A	X6004	CALLER B
1. Caller A makes a call to caller B.	2. The X6004 routes the call to caller B at extension 1004.	3. Caller B picks up the call.
Conversation between caller A and B		
		4. Caller B transfers the call to the call parking lot. (This is done by dialing # followed by the parking lot number.
	5. The X6004 parks the call and informs caller B of the number to call to reconnect to the call. This is called the parking slot number.	

Table 90 Call Parking Progression

CALLER A	X6004	CALLER B
		6. Caller B walks to another extension and reconnects to the call with A by dialing # followed by the parking slot number.
Conversation between caller A and B continues		

22.7.1 Call Parking Configuration

Use this screen to configure call parking on the X6004. Click **Configuration > PBX > Call Settings > Call Park** to view the **Call Parking** screen.

Figure 186 Call Parking Configuration

The screenshot shows the 'Call Parking' configuration interface. It includes a title bar, a sub-header, and three labeled input fields: 'Representative Number' (700), 'Amount of Parking Position / ZyStack' (16), and 'Parking Time' (180 sec.). 'Apply' and 'Reset' buttons are at the bottom.

The following table describes the labels in this screen.

Table 91 Call Parking Configuration

LABEL	DESCRIPTION
Call Parking Setting	
Representative Number	Enter the telephone number users should dial to park a telephone call.
Amount of Parking Position / ZyStack	Enter the number of call parking extensions available. This also establishes the range of numbers that users will have to dial to retrieve a parked call.
Parking Time	Enter the maximum number of seconds that a call can be parked. After a parked call exceeds this amount of time, it is routed back to the original extension that parked the call.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to set every field in this screen to its last-saved value.

ZyStack

This chapter shows you how to combine two or more X6004s to expand your IP PBX capabilities and utilize a failsafe mechanism in case of a breakdown.

23.1 ZyStack Overview

A ZyStack is the aggregation of multiple X6004s under a single management IP address. A ZyStack provides two major advantages. Firstly, it allows you to pool the resources of individual X6004s. Secondly, it provides a failsafe mechanism in case of a breakdown of one of the X6004s in a ZyStack.

When you create a ZyStack, the X6004s can take on a role of a master or a slave. There can only be one master X6004. You can manage the configuration of the master and slave X6004s by logging into the LAN or WAN IP address of the master X6004.

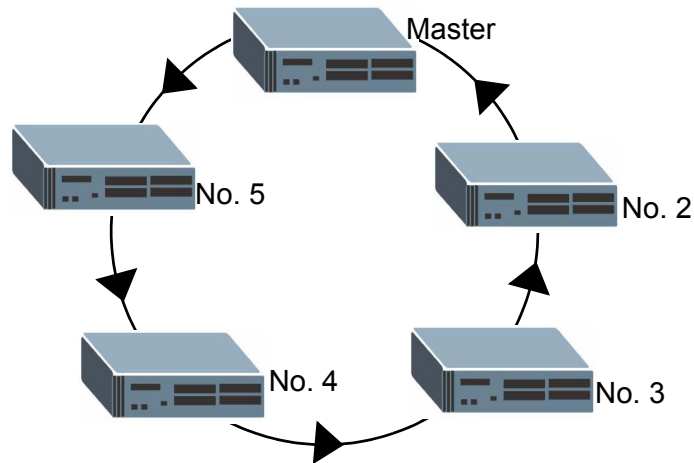
23.1.1 ZyStack Requirements

In order for ZyStack to work you must follow these guidelines:

- All the X6004s should use the same interface, either LAN or WAN, to create a ZyStack. The setting on the master X6004 determines which interface the X6004s should use.
- All the X6004 should be on the same subnet. This is necessary for the X6004s to be able to backup each other. The failsafe mechanism utilizes IP alias. IP alias allows the X6004 to communicate via two IP addresses. The first is the IP address assigned to the X6004 itself and the second is the IP address of the X6004 that has failed. This feature is limited to a single routing domain.

23.1.2 ZyStack Failover Mode - Active

In the active mode failover all the X6004 participating in the ZyStack are also actively participating in the processing of phone calls. The ZyStack forms a ring with each X6004 serving as a backup for the X6004 one step higher in its hierarchy. The hierarchy is organized in the order that each X6004 joined the ZyStack. The first X6004 is the master and it is backed up by the X6004 that was the second member of the ZyStack. The second member is backed up by the third and so on. Finally, the master serves as a backup to the last member to join the ZyStack. The following figure illustrates the active mode failsafe.

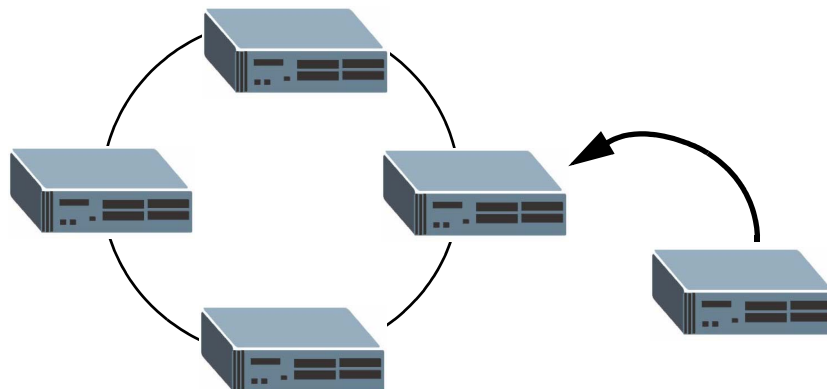
Figure 187 ZyStack - Active Mode

When one of the X6004 fails, then its backup X6004 services the SIP clients that used to connect to the X6004.

The backup can not, however, recreate extensions created for the analog phones on the X6004 that is down, nor can it recreate the outside lines via the FXO ports. FXS and FXO links are physical connections to an X6004 and can't be duplicated by a backup X6004. FXS extensions and FXO connections must be recreated in order so that they can be used again.

23.1.3 ZyStack Failover Mode - Standby

In standby mode, one of the X6004s does not actively participate in the processing of phone calls. It only gets involved in case of a break down on one of the X6004s. When a member of the ZyStack breaks down the X6004 that was on the sideline is ready to take the place of the downed X6004. In this failsafe mode, all of the X6004s have the same copy of the configuration. The X6004 that was standing by, is able to replace the broken down X6004 immediately.

Figure 188 ZyStack - Standby Mode

Again, the backup can not recreate the extensions created for analog phones of the X6004 that is down, nor can it recreate the outside lines via the FXO ports. FXS and FXO links are physical connections to an X6004 and can't be duplicated by a backup X6004. FXS extensions and FXO connections must be recreated in order so that they can be used again.

23.2 ZyStack Setting

Use this screen to view and manage your ZyStack settings. Click **Configuration > ZyStack > Settings** in the navigation panel to view the screen as shown.

Figure 189 Configuration > ZyStack > Setting

Setting						
<div> :Add :Edit :Delete :Reboot </div>						
Machine ID	Description	WAN IP	LAN IP	Z_Interface	Type	
IPPBX_001	Localhost	172.23.37.201	192.168.1.13	LAN	Master	
IPPBX_002	secondary	172.23.23.234	192.168.1.12	LAN	Slave	

The following table describes the labels in this screen.

Table 92 ZyStack > Setting

LABEL	DESCRIPTION
Machine ID	This field displays the system name of the X6004. The system name is automatically assigned to the X6004 based on when it was added to the ZyStack. IPPBX_01 is always the master followed by slaves IPPBX_02 , IPPBX_03 and so on.
Description	This field displays the description of this ZyStack member.
WAN IP	This field displays the WAN IP address of the X6004.
LAN IP	This field displays the LAN IP address of the X6004.
Z_Interface	This field displays the interface (LAN or WAN) which the X6004s use to form the ZyStack. This interface is the same for all X6004 in the ZyStack.
Type	This field displays the role this X6004 performs in the ZyStack. The options are: <ul style="list-style-type: none"> Master - controls configuration on all the other X6004s. Slave - all configuration is done on the slave from the master X6004.
Add / Edit / Reboot / Delete	Click the Add icon to create or expand a ZyStack by configuring a new member. Click Edit to change the settings of an existing ZyStack member. Click Reboot to shut down and restart a specific member of the ZyStack. Click Delete to remove an existing member from a ZyStack.

23.2.1 ZyStack Add Screen

Use this screen to add an X6004 to your ZyStack. Click the **Add** icon in the **Configuration > ZyStack > Setting** screen to view the screen as shown.

Figure 190 ZyStack Add

ZyStack Add

ZyStack Add

Serial

Description

WAN IP

LAN IP

Z_Interface

LAN

Failsafe

Active

Add

Cancel

The following table describes the labels in this screen.

Table 93 ZyStack Add

LABEL	DESCRIPTION
ZyStack Add	Use this section to add an additional member to your ZyStack.
Serial	Type the serial number of the X6004 you want to add to the ZyStack. You can get the serial number by clicking on the edit icon in the Configuration > ZyStack > Setting screen of an X6004 that is not part of a ZyStack.
Description	Type a description for this ZyStack member.
WAN IP	Type the WAN IP address of the X6004 you want to add to the ZyStack.
LAN IP	Type the LAN IP address of the X6004 you want to add to the ZyStack.
Z_Interface	This field is only configurable for the ZyStack master. It displays whether the interface on the master X6004 is LAN or WAN for the ZyStack.
Failsafe	Select the failsafe mode for this ZyStack. Select Active if you want all the X6004 to be in operational mode in the ZyStack or Select Standby if you want the X6004 to act as a back up in case of a failure of a ZyStack member. See Section 23.1 on page 207 for more information.
Add	Click Add to save your changes to the X6004.
Cancel	Click Cancel to go back to the previous screen without saving your changes.

23.2.2 ZyStack Edit Screen

Use this screen to edit the serial number or description of an existing ZyStack member. Click the **Edit** icon in the **Configuration > ZyStack > Setting** screen to view the screen as shown.

Figure 191 ZyStack Edit

The screenshot shows the 'ZyStack Edit' screen. At the top, there is a blue header bar with the text 'ZyStack Edit'. Below this, the screen is divided into two main sections. The left section contains labels for various fields: Machine ID, Serial, Description, WAN IP, LAN IP, Z_Interface, Type, WAN MAC, and LAN MAC. The right section contains the corresponding values: IPPBX_002, 12373, secondary, 172.23.23.234, 192.168.1.12, LAN, Slave, 00A0C5123456, and 00A0C5123457. At the bottom right, there are three buttons: 'Set', 'Cancel', and 'Reset'.

The following table describes the labels in this screen.

Table 94 ZyStack Edit

LABEL	DESCRIPTION
Machine ID	This field displays the system name of the X6004. The system name is automatically assigned to the X6004 based on when it was added to the ZyStack. IPPBX_01 is always the master (or a stand-alone IPPBX) followed by slaves IPPBX_02 , IPPBX_03 and so on.
Serial	Type the serial number of the X6004 you want to add to the ZyStack. You can get the serial number by clicking on the edit icon in the Configuration > ZyStack > Setting screen of an X6004 that is not part of a ZyStack.
Description	Type a description for this ZyStack member.

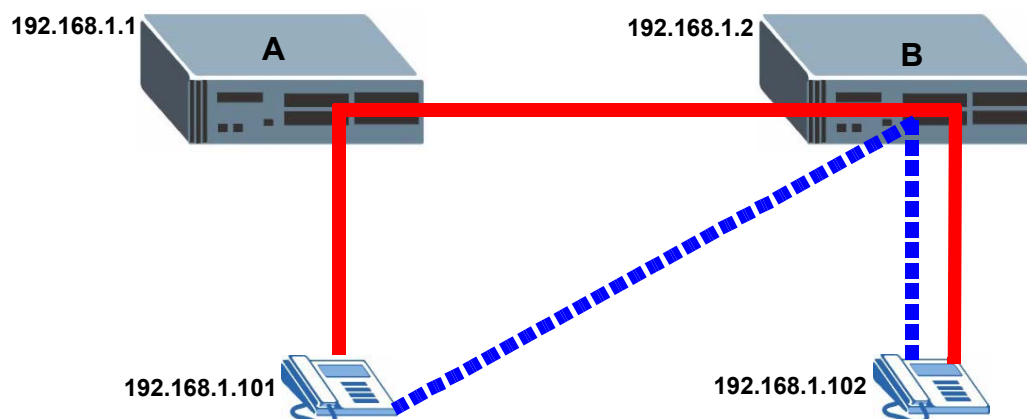
Table 94 ZyStack Edit (continued)

LABEL	DESCRIPTION
WAN IP	This field displays the WAN IP address of the X6004.
LAN IP	This field displays the LAN IP address of the X6004.
Z_Interface	This field displays the interface (LAN or WAN) which the X6004s use to form the ZyStack. This interface is the same for all X6004 in the ZyStack.
Type	This field displays whether the X6004 is a Master or a Slave member of the ZyStack.
WAN MAC	This field displays the MAC address of the WAN interface of this X6004.
LAN MAC	This field displays the MAC address of the LAN interface of this X6004.
Set	Click Set to save your changes.
Cancel	Click Cancel to go back to the previous screen without saving your changes.
Reset	Click this to reset the screen to the last saved configuration.

23.3 ZyStack Internal Call Routing

When an IP phone is a SIP client of one X6004 (**A** in the figure) and it calls a telephone that is a SIP client of another X6004 (**B** in the figure). The default behavior of the X6004 (**A**) is to process the call and connect it to the X6004 (**B**) on which the SIP client is configured. This telephone call is illustrated by the solid line in the following figure. Note that the processing resources of both X6004s are being utilized throughout the duration of the call.

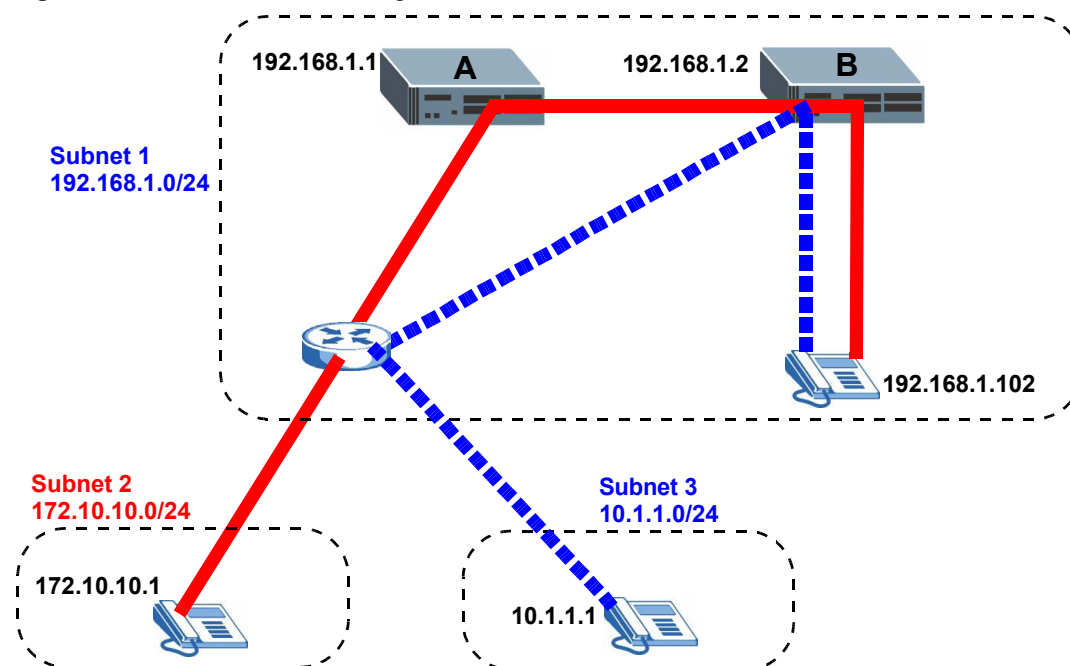
The X6004s can handle internal calls more efficiently if you specify the local subnets which can connect to other ZyStack members. The dotted line shows the same phone call after it has been redirected to X6004 **B**. In this scenario the subnet **192.168.1.0/24** was configured as a local subnet. When **A** receives a call from a SIP client that matches the local subnet and the destination of the client's request is a phone connected to another X6004 (**B**), it then redirects the call to **B**.

Figure 192 Internal Call Routing

In this first example all the devices reside on the same subnet. A single subnet configuration is recommended for ease of use and management. This, however, is not always possible in your network.

The following example shows an example where your IP phones are located in different subnets on your network. The X6004s are still on the same subnet (**Subnet 1**). IP phones in **Subnet 2** and **Subnet 3** are both SIP clients of X6004 **A**. In this example, **Subnet 3** has been configured as a local subnet. When a X6004 **A** receives a call from a phone on **Subnet 3** that is directed to a SIP client of X6004 **B**, it is then able to redirect the call directly to X6004 **B**. **Subnet 2**, however, has not been configured as a local subnet. Calls that originate from **Subnet 2** must go through X6004 **A** and **B** in order to reach SIP clients connected to **B**.

Figure 193 Internal Call Routing



23.4 ZyStack Intranet Setup

Use this screen to manage local subnets from which IP phones connect to the X6004s in the ZyStack. Click **Configuration > ZyStack > Intranet** to view the following screen.

Figure 194 ZyStack Intranet

The following table describes the labels in this screen.

Table 95 ZyStack Intranet

LABEL	DESCRIPTION
Delete	Select the check boxes of the intranets you want to remove and click the Delete button to remove them.
No	This field displays the index number of an intranet configured for this ZyStack.

Table 95 ZyStack Intranet (continued)

LABEL	DESCRIPTION
Intranet	This field displays the intranet configured for this ZyStack. It is displayed in CIDR (Classless Inter-Domain Routing) format. The CIDR format is displayed as follows: "IP address/number of matching initial bits in the IP address". For example, 192.168.1.0/24 indicates the range of IP addresses 192.168.1.0 - 192.168.1.255 with the subnet mask 255.255.255.0 . See Appendix A on page 287 for more information on IP addresses and subnet masks.
Add / Delete	Click the Add button to add an intranet for this ZyStack. Click the Delete button to remove an existing intranet from this ZyStack.

23.4.1 ZyStack Add Intranet

Use this screen to add local subnets from which IP phones connect to the X6004s in the ZyStack. Adding network subnets helps to increase the efficiency of call routing. Click **Add** in the **Configuration > ZyStack > Intranet** screen to view the following screen.

Figure 195 ZyStack Add Intranet

The following table describes the labels in this screen.

Table 96 ZyStack Add Intranet

LABEL	DESCRIPTION
IPv4 subnet in CIDR format	Type the IP address which identifies this network and specify how many initial bits in the IP address of a host must match. The subnet is specified via CIDR (Classless Inter-Domain Routing) format. The CIDR format is displayed as follows: "IP address/number of matching initial bits in the IP address". For example, 192.168.1.0/24 indicates the range of IP addresses 192.168.1.0 - 192.168.1.255 with the subnet mask 255.255.255.0 . See Appendix A on page 287 for more information on IP addresses and subnet masks.
Add	Click Add to save your changes.
Cancel	Click Cancel to go back to the previous screen without saving your changes.

23.5 ZyStack Status

Use this screen to view the status of the ZyStack as well as perform network connectivity tests between X6004s. Click **Configuration > ZyStack > Status** to view the following screen.

Figure 196 ZyStack Status

Status					
Zystack Status List					
Machine ID	Description	Type	Ping Ping All	Delete	Failsafe
IPPBX_001	Localhost	Master	N/A	N/A	N/A
IPPBX_002	secondary	Slave	N/A	N/A	N/A
Refresh					
Zystack Add Failure Log					
Machine ID	Serial	Fail Reason	Clear Log		

The following table describes the labels in this screen.

Table 97 ZyStack Status

LABEL	DESCRIPTION
ZyStack Status List	This table displays the X6004s participating in the ZyStack and their current status.
Machine ID	This field displays the system name of the X6004. The system name is automatically assigned to the X6004 based on when it was added to the ZyStack. IPPBX_01 is always the master followed by slaves IPPBX_02 , IPPBX_03 and so on.
Description	This field displays the description of this ZyStack member.
Type	This field displays the role this X6004 performs in the ZyStack. The options are: <ul style="list-style-type: none"> Master - controls configuration on all the other X6004s. Slave - all configuration is done on the slave from the master X6004.
Ping	Click a Ping button to test IP connectivity with one member of the ZyStack or click Ping All to test IP connectivity with all members of the ZyStack. This field displays N/A when this function is not available for a specified X6004. This field displays Ok if you have a network connection from the master to the slave X6004.
Delete	This field displays the reason for not being able to delete an X6004 from the ZyStack. The field displays: <ul style="list-style-type: none"> Timeout - if the master X6004 was unable to establish a connection with the X6004 that you wanted to remove from the ZyStack. Wrong Master - if the X6004 is already a member of another ZyStack. Wrong Slave - if the serial number did not match when removing this X6004 from the ZyStack.
Failsafe	This field displays the machine ID of the X6004 that has taken over the functions of an X6004 that has failed. For example, if it displays IPPBX_003, then it means that IPPBX_002 has failed and IPPBX_003 has taken over.
ZyStack Add Failure Log	This table is a list of log entries regarding successful and unsuccessful attempts to add X6004s to the ZyStack.
Machine ID	This field displays the system name of the X6004. The system name is automatically assigned to the X6004 based on when it was added to the ZyStack. IPPBX_01 is always the master followed by slaves IPPBX_02 , IPPBX_03 and so on.
Serial	This field displays the serial number that was entered when trying to add this X6004 to the ZyStack.

Table 97 ZyStack Status (continued)

LABEL	DESCRIPTION
Fail Reason	<p>This field displays the reason for not being able to add an X6004 to the ZyStack. The field displays:</p> <ul style="list-style-type: none">• Timeout - if the master X6004 was unable to establish a connection with the X6004 that wanted to join the ZyStack.• Wrong Master - if the X6004 is already a member of another ZyStack.• Wrong Slave - if an incorrect serial number was entered when adding this X6004 to the ZyStack.
Clear Log	Click the Clear button to erase the ZyStack log.

PART IV

Monitor, Log & Maintenance

System Information (219)
Status Observation (223)
System Log (229)
Call Detail Record (CDR) (239)
Maintenance (245)
Diagnostics (249)
System File Maintenance (253)
myZyXEL.com (259)




System Information

This chapter shows you how to view system information via the **Monitor** page.

24.1 System Information Overview

The **System Information** screen allows you to view essential information about the X6004. Click **Monitor > System Information** in the web configurator to view the screen as shown.

Figure 197 Monitor > System Information

System Information						
System Information						
#	IP Address		ZyStack	Status	Backup By	F/W Version
	WAN	LAN				
1	172.23.37.201	192.168.1.12	Master	On		1.00(AVA.0)b3
Hardware Information						
#	CPU(MIPS):	Memory(MB):	File System:	Trunk(port#)		DSP
				FXO	FXS	
1	527.56	257	256MB	4	4	21
IPPBX Information						
#	Outbound Line			License		
	FXO Trunk	SIP Trunk	Trusted Peer	Extension	softphone	
1	4	1	0	16	0	
Device Monitor						
#	File System:		Extension			
	Flash	HDD	SIP	FXS		
1	 17%	 N/A	 50%	 75%		

Each field is described in the following table.

Table 98 Monitor > System Information

LABEL	DESCRIPTION
System Information	
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.

Table 98 Monitor > System Information (continued)

LABEL	DESCRIPTION
IP Address	These two fields display the IP addresses of the of the WAN and LAN interfaces on the X6004.
ZyStack	This field displays: Master - if the X6004 is the master for all of the X6004s in a ZyStack. This field also displays Master if this X6004 is set up as a stand alone IP PBX. Slave - if this X6004 is a slave in a ZyStack.
Status	This field displays: On - If the X6004 is powered on. Off - If this X6004 is not receiving power.
Backup By	Displays the IP address of the X6004 that serves as the backup IPPBX for this X6004 (only applicable in a ZyStack configuration).
F/W Version	This field displays the firmware version currently installed on the X6004.
Hardware Information	
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
CPU(MIPS)	This field displays the speed of the processing chip on the X6004 in MIPS (Millions of Instructions Per Second).
Memory(MB)	This field displays the total RAM memory available on the X6004. This is the memory available for processing functions on the X6004.
File System	This field displays the total memory available for the files system on the X6004. The file system stores information such as configuration settings, CDR and voicemail. This number is the sum of the built in flash memory and the optional hard disk (if installed).
Trunk(port#)	These fields display the number of FXO ports (ports leading to the PSTN) and the number of FXS ports (ports leading to analog phones on your network) installed on the X6004.
DSP	This field displays the capacity of the DSP (Digital Signal Processing) modules installed on the X6004. The capacity is displayed in the number of channels the X6004 can process at any one time.
IPPBX Information	
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
Outbound Line	These fields display the number of outside lines configured on the X6004. They are divided into the following categories: <ul style="list-style-type: none"> • FXO Trunk - connections via the FXO ports to your local telephone company. • SIP Trunk - connections to a SIP server at your VoIP provider. • Trusted Peer lines - connections to a peer SIP device. A peer SIP device could be another X6004 or another SIP server that allows you to use its services.
License	These fields display the number of licenses you have for subscription services via myZyXEL.com website. The services are divided into the following categories: <ul style="list-style-type: none"> • Extension - This is the number of SIP extensions you can configure on the X6004. • softphone - This is the number of ZyXEL's V100 softphones you can register with the X6004.
Device Monitor	

Table 98 Monitor > System Information (continued)

LABEL	DESCRIPTION
#	This field displays the index number of the X6004. If you have a ZyStack configured then this screen displays information about all the X6004 in the ZyStack.
File System	<p>These fields display the current utilization of the available memory on the X6004. They are divided into the following categories:</p> <ul style="list-style-type: none"> • Flash - This field displays the percentage of the total built in memory currently being used up on the X6004. • HDD - This field displays the percentage of your hard disk memory (if a hard disk is installed) currently used up on the X6004.
Extension	<p>These fields display the utilization percentage of your available SIP extensions and FXS extension. An extension is considered to be utilized as soon as it is created.</p> <p>The number of SIP extensions you are allowed to create on the X6004 is limited by the subscription service on the X6004.</p> <p>The number of FXS extensions you are allowed to create on the X6004 is limited by the number of FXS ports you have installed on the X6004. The FXS ports are used to connect analog phones to the X6004.</p>

Status Observation

This chapter shows you how to view detail status information about SIP and FXS extensions as well as the FXO and SIP trunks configured on the X6004.

25.1 SIP Peer Status

Use the **SIP Peer** screen to view status information about the SIP extensions configured on the X6004. Click **Monitor > Status Observation > SIP Peer** in the web configurator to view the screen as shown.

Figure 198 Monitor > Status Observation > SIP Peer

SIP Peer

Query

Machine ID

IPPBX_001

Query

Refresh interval :

0

 sec.

Apply

SIP Peer

Machine ID	Group Name	User Name	Extension Number	Registration Status	Call Status
IPPBX_001	Sales	1000	1000	offline	idle
IPPBX_001	Sales	1001	1001	offline	idle
IPPBX_001	Sales	1002	1002	offline	idle
IPPBX_001	Sales	1003	1003	offline	idle
IPPBX_001	Sales	1004	1004	offline	idle
IPPBX_001	Sales	1005	1005	offline	idle
IPPBX_001	Sales	1006	1006	offline	idle
IPPBX_001	Sales	1000	web1000	offline	idle
IPPBX_001	Sales	1001	web1001	offline	idle
IPPBX_001	Sales	1002	web1002	offline	idle
IPPBX_001	Sales	1003	web1003	offline	idle
IPPBX_001	Sales	1004	web1004	offline	idle
IPPBX_001	Sales	1005	web1005	offline	idle
IPPBX_001	Sales	1006	web1006	offline	idle

Each field is described in the following table.

Table 99 Monitor > Status Observation > SIP Peer

LABEL	DESCRIPTION
Query	<p>Use this section to specify your query criteria. You can select an attribute-value pair for your search. You can choose to query by:</p> <ul style="list-style-type: none"> • Machine ID - choose the X6004 (if you have a ZyStack configured) for which you want to view status details of SIP extensions. • Authority Group - select a specify authority group for which you want to view status details of SIP extensions. • Registration Status - select to view status details about SIP extension with which SIP devices have registered (online) or view status details about SIP extensions with which no SIP device is currently registered (offline). • Call Status - select whether you want to view status details about extensions that are currently busy or idle. <p>Click Query to update the status detail table in the SIP Peer section of the screen.</p>
Refresh interval	<p>Enter how often (seconds) you want the X6004 to update this screen. Click Apply to update the screen immediately.</p> <p>If you do not want this screen to update periodically, enter 0.</p>
SIP Peer	This section displays the status detail table.
Machine ID	This field displays the auto-configured name of the X6004.
Group Name	This field displays the authority group name to which an extension belongs.
User Name	This field displays the user name associated with a SIP extension.
Extension Number	<p>This field displays the SIP extension number. For each SIP extension there is also a web phone extension listed in the following format web + extension number. For example, extension 1001 also has a web phone extension web1001 listed in this table. The web phone extensions allow you to see whether a web phone is being used for a specific SIP extension.</p>
Registration Status	<p>This field displays online, if an IP phone is registered with the X6004. It displays offline if no IP phone is registered with the X6004 for a specific extension.</p> <p>For the web phone feature, it displays online, if a user has logged in the web phone feature, otherwise it displays offline.</p>
Call Status	This field displays busy if a SIP extension is currently engaged, otherwise it displays idle .

25.2 FXS Peer Status

Use the **FXS Peer** screen to view status information about the FXS extensions configured on the X6004. Click **Monitor > Status Observation > FXS Peer** in the web configurator to view the screen as shown.

Figure 199 Monitor > Status Observation > FXS Peer

Machine ID	Slot	Port	Number	Call Status
IPPBX_001	A	1	5000	idle
IPPBX_001	A	2	N/A	idle
IPPBX_001	A	3	N/A	idle
IPPBX_001	A	4	N/A	idle

Each field is described in the following table.

Table 100 Monitor > Status Observation > FXS Peer

LABEL	DESCRIPTION
Query	<p>Use this section to specify your query criteria. You can select an attribute, value pair for your search. You can choose to query by:</p> <ul style="list-style-type: none"> Machine ID - choose the X6004 (if you have a ZyStack configured) for which you want to view status details of FXS extensions. Call Status - select whether you want to view status details about extensions that are currently busy or idle. <p>Click Query to update the status detail table in the FXS Peer section of the screen.</p>
Refresh interval	<p>Enter how often (seconds) you want the X6004 to update this screen. Click Apply to update the screen immediately.</p> <p>If you do not want this screen to update periodically, enter 0.</p>
FXS Peer	This section displays the status detail table.
Machine ID	This field displays the auto-configured name of the X6004.
Slot	This field displays the slot (A - D) where the FXS interface card is installed.
Port	This field displays the port number on the FXS interface card.
Number	This field displays the extension number associated with an FXS port or it displays N/A , if no FXS extension has been configured for an FXS port.
Call Status	This field displays busy if an FXS extension is currently engaged, otherwise it displays idle .

25.3 FXO Trunk Status

Use the **FXO Trunk** screen to view status information about external connections via FXO interface cards. Click **Monitor > Status Observation > FXO Trunk** in the web configurator to view the screen as shown.

Figure 200 Monitor > Status Observation > FXO Trunk

Machine ID	Slot	Port	Group Name	Call Status
IPPBX_001	B	1	N/A	idle
IPPBX_001	B	2	N/A	idle
IPPBX_001	B	3	N/A	idle
IPPBX_001	B	4	N/A	idle

Each field is described in the following table.

Table 101 Monitor > Status Observation > FXO Trunk

LABEL	DESCRIPTION
Query	Use this section to specify your query criteria. You can select an attribute, value pair for your search. You can choose to query by: <ul style="list-style-type: none"> Machine ID - choose the X6004 (if you have a ZyStack configured) for which you want to view status details of FXO connections. Call Status - select whether you want to view status details about FXO lines that are currently busy or idle. Click Query to update the status detail table in the FXO Trunk section of the screen.
Refresh interval	Enter how often (seconds) you want the X6004 to update this screen. Click Apply to update the screen immediately. If you do not want this screen to update periodically, enter 0 .
FXO Trunk	This section displays the status detail table.
Machine ID	This field displays the auto-configured name of the X6004.
Slot	This field displays the slot (A - D) where the FXO interface card is installed.
Port	This field displays the port number on the FXO interface card.
Group Name	This field displays the outbound line group name to which an FXO line is assigned.
Call Status	This field displays busy if an FXO line is currently engaged, otherwise it displays idle .

25.4 SIP Trunk Status

Use the **SIP Trunk** screen to view status information about external connections to other SIP servers. Click **Monitor > Status Observation > SIP Trunk** in the web configurator to view the screen as shown.

Figure 201 Monitor > Status Observation > SIP Trunk

Machine ID	Group Name	User Name	Host	Port	Registration Status	Call Status
IPPBX_001	ITSP1	admin	172.23.37.202	5060	offline	idle
IPPBX_001	Voip	232323	10.1.1.1	5060	offline	idle

Each field is described in the following table.

Table 102 Monitor > Status Observation > SIP Trunk

LABEL	DESCRIPTION
Query	<p>Use this section to specify your query criteria. You can select an attribute, value pair for your search. You can choose to query by:</p> <ul style="list-style-type: none"> • Machine ID - choose the X6004 (if you have a ZyStack configured) for which you want to view status details of SIP trunks. • Registration Status - select to view status details about SIP trunks which have successfully registered with a SIP server (online), SIP trunks which are in the process of registering with a SIP server (Auth. Sent) or SIP trunks that have failed to register with a SIP server (offline). • Call Status - select whether you want to view status details about SIP trunks that are currently busy or idle. <p>Click Query to update the status detail table in the SIP Trunk section of the screen.</p>
Refresh interval	<p>Enter how often (seconds) you want the X6004 to update this screen. Click Apply to update the screen immediately.</p> <p>If you do not want this screen to update periodically, enter 0.</p>
SIP Trunk	This section displays the status detail table.
Machine ID	This field displays the auto-configured name of the X6004.
Group Name	This field displays the outbound line group name of this SIP trunk.
User Name	This field displays the SIP authentication user name associated with the SIP account used for this SIP trunk.
Host	This field displays the IP address of the SIP server for the SIP server associated with this SIP trunk.
Port	This field displays the port number used for SIP communication with a SIP server.
Registration Status	This field displays online if the X6004 successfully registered with the SIP server for this SIP trunk, offline if the X6004 failed to register with the SIP server for this SIP trunk or Auth. Sent if the X6004 is in the process of registering with the SIP server associated with this SIP trunk.
Call Status	This field displays busy if a SIP line is currently engaged, otherwise it displays idle .

System Log

This chapter contains information about configuring log settings and viewing the X6004's logs.

26.1 System Log Overview

The X6004 monitors different aspects of its operations and can be configured to record events based on the source of the event. The following are sources of events for which the X6004 can create logs:

- **IPPBX** - activities related to the PBX functions of the X6004. Some examples include: an FXS interface card failure, new SIP extension created or ZyStack member failure.
- **User** - activities related to administrator account activities. Some examples include: a successful login of an administrator or a failure to login by an administrator.
- **myZyXEL.com** - activities related to services registered via myZyXEL.com. Some examples include: registration of additional SIP extensions or registration of ZyXEL's V100 softphones.
- **Default** - all other activities related to the functions of the X6004. Some examples include: failure to reach a DNS server or new IP address received from a DHCP server.

The X6004 can also be configured to send email alerts to an administrator based on the severity of the event recorded. The following table outlines the severity levels of the logs on the X6004.

Table 103 Log Severity

SEVERITY LEVEL	DESCRIPTION	ALERT SENT?
EMERG	Emergency logs are created when the X6004 is unusable, for example a power failure.	YES
ALERT	Alert logs are created when administrative action must be taken immediately, for example the backup power supply has been activated.	YES
CRIT	Critical logs are created when a critical condition occurs on the X6004, for example the system is running low on memory.	YES
ERR	Error logs are created when an error occurs on the X6004, for example a login failure by an administrator.	NO
WARNING	Warning logs are created when a warning condition occurs on the X6004, for example when the X6004 fails to register an extension.	NO
NOTICE	Notice logs are created when normal but significant events occur on the X6004. For example, a new administrator account is created on the X6004.	NO

Table 103 Log Severity (continued)

SEVERITY LEVEL	DESCRIPTION	ALERT SENT?
INFO	Information logs are created when normal events occur. For example, a successful creation of a SIP extension.	NO
DEBUG	Debugging logs are used by service and development engineers to monitor the operations of the X6004. It is recommended not to turn these logs on unless instructed by support technicians.	NO

26.2 View Log

The web configurator allows you to look at all of the X6004's logs in one location.

Click **Report > LOGS > System Log > View Log** to open the **View Log** screen. Use this screen to see the logs for the categories that you selected in the **Log Setting** screen (see [Section 26.3 on page 232](#)). Options include logs about system errors and administrator logins.

The log wraps around and deletes the old entries after it fills. Click a column heading to sort the entries. A triangle indicates ascending or descending sort order.

Figure 202 Report > LOGS > System Log > View Log

Each field is described in the following table.

Table 104 Report > LOGS > System Log > View Log

LABEL	DESCRIPTION
Logs	
Show Filter	Click this button to filter the logs you want to view. The screen changes to the one shown in Section 26.2.1 on page 231 .
Display	Select a category of logs to view; select All Logs to view logs from all of the log categories that you selected in the Log Setting page. Refer to Section 26.1 on page 229 for more information on log categories.
Email Log Now	Click Email Log Now to send the log screen to the e-mail address specified in the Log Setting page (see Section 26.3 on page 232).
Refresh	Click Refresh to renew the log screen.
Clear Log	Click Clear Log to delete all logs.
Total logging entries	This field displays the total number of log entries on the X6004.
entries per page	Select the total number of messages that you want to display on one page.
Page	This field displays which page of the log you are currently viewing. It is in "current page/total pages" format. In other words "1/4" means that you are viewing the first page of a four page log file.

Table 104 Report > LOGS > System Log > View Log (continued)

LABEL	DESCRIPTION
Left / Right	Click the Left button to view the previous log page or click the Right button to view the next log page.
#	This field displays a sequential number of the log.
Time	This field displays the time the log was recorded. See Section 6.5 on page 89 to configure the X6004's time and date.
Message	This field states the reason for the log.
Source	This field lists the source IP address of the incoming packet.
Destination	This field lists the destination IP address of the incoming packet. This is typically the LAN or WAN IP address of the X6004.
Note	This field displays additional information about the log entry.

26.2.1 Filter Log Results

Use this screen to filter the logs you want to view. Click the **Show Filter** button in the **View Log** screen to bring up the log filter.

Figure 203 Report > LOGS > System Log > View Log: Show Filter

Each field is described in the following table.

Table 105 Report > LOGS > System Log > View Log: Show Filter

LABEL	DESCRIPTION
Display	Select a category of logs to view; select All Logs to view logs from all of the log categories that you selected in the Log Setting page. Refer to Section 26.1 on page 229 for more information on log categories.
Keyword	You can filter the logs to only display log entries that match a string you enter in this field. A string can be a word, a number or a combination of words and numbers. Type the string you want to search the logs for.
Source Address	You can filter the logs to only display log entries that are created as a result of some action originating at a particular IP address. For example, an administrator logging into the X6004 from a computer with a particular IP address on your network. Type the IP address you want to search for as the source IP address of the X6004.
Destination Address	You can filter the logs to only display log entries that are created as a result of some action terminating at a particular IP address. This is typically the X6004's LAN or WAN IP address. Type the IP address you want to search for as the destination IP address of the X6004.
Search	Click Search to show the filtered results of your logs. Only the logs that match the criteria you specified are displayed.

26.3 Log Setting

The log setting screen lets you view the settings configured for the internal system log and the remote syslog servers. Use this screen to access the configuration pages for internal and external log servers. Click **Report > Logs > System Log > Log Setting** to view the screen as shown next.

Figure 204 Report > LOGS > System Log > Log Setting

View Log		Log Setting		
Log Setting				
#	Name	Log Format	Summary	Modify
1	System Log	Internal	Mail Server : Mail Subject : Send From : Send Log to : Send Alert to : Schedule : When Full	<div>Lightbulb icon</div> <div>Edit icon</div>
2	Remote Server 1	Syslog	Server Address : Log Facility : Local 1	<div>Lightbulb icon</div> <div>Edit icon</div>
3	Remote Server 2	Syslog	Server Address : Log Facility : Local 1	<div>Lightbulb icon</div> <div>Edit icon</div>
4	Remote Server 3	Syslog	Server Address : Log Facility : Local 1	<div>Lightbulb icon</div> <div>Edit icon</div>
5	Remote Server 4	Syslog	Server Address : Log Facility : Local 1	<div>Lightbulb icon</div> <div>Edit icon</div>

Each field is described in the following table.

Table 106 Report > LOGS > System Log > Log Setting

LABEL	DESCRIPTION
#	This is an index number identifying the system and remote log servers.
Name	This field displays the name of the log servers. System Log is the name of the internal log server and Remote Server 1 through 4 are the external syslog servers.
Log Format	This field displays: Internal for the system log and Syslog for the remote log servers.
Summary	This field summarizes the settings you configured for the log servers. Click the Edit icon in the Modify column to change any of the settings that are displayed.
Modify	<p>The lightbulb in this field is displayed as glowing green when the corresponding log server is activated. The lightbulb is displayed as grayed out when the corresponding log server is not activated.</p> <p>Click the Edit icon to configure log settings for the system log or one of the external syslog servers.</p>
Active Log Summary	Click the Active Log Summary button to view and edit the categories the X6004 logs in the internal and external log servers.
Apply	Click the Apply button to save your changes to the X6004.

26.3.1 Active Log Summary

The **Active Log Summary** screen allows you to view and edit the categories the X6004 logs in the internal and external log servers. Click the **Active Log Summary** button in the **Report > LOGS > System Log > Log Setting** screen to view the screen as shown next.

Figure 205 Report > LOGS > System Log > Log Setting > Active Log Summary

Log Category	System Log		E-mail Server 1		E-mail Server 2		Remote Server 1		Remote Server 2		Remote Server 3		Remote Server 4	
	-	-	E-mail	E-mail	Syslog	Syslog	Syslog	Syslog	Syslog	Syslog	Syslog	Syslog	Syslog	
	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
All Logs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
IPPBX	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
User	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
myZyXEL.com	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Default	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Each field is described in the following table.

Table 107 Report > LOGS > System Log > Log Setting > Active Log Summary

LABEL	DESCRIPTION
Active Log Category	Enter the telephone number you want to block from calling you when you enable call blocking. Click Add and the number you entered displays in the field below.
Log Category	<p>This column displays the source of log events that you can record on the X6004. The categories are:</p> <ul style="list-style-type: none"> All Logs - all logs generated on the X6004. IPPBX - all activities related to the PBX functions of the X6004. For example, a an FXS card failure. User - administrator activity, such as a successful login. myZyXEL.com - service registration with the myZyXEL.com website Default - All other logs generated by the X6004. For example, failure to reach a DHCP server.
System Log	<p>Select whether you want to enable logging and the types of logs to record for each source of logs as described in the Log Category field. The choices are:</p> <ul style="list-style-type: none"> Disable All Logs - Do not log any events. Enable Normal Logs - Log all events excluding debug events. Debug logs are used by service technicians and development engineers. Enable All Logs - Log all events.
E-mail Server 1/2	<p>Select whether you want to send logs to the e-mail address of an administrator you specify in the Log Setting screen.</p> <ul style="list-style-type: none"> Enable Normal Logs - Select this to send logs to an administrator at the time interval you specify in the Log Setting screen. Enable Alert Log - Select this to send e-mail alerts to an administrator when emergency, alert or critical level logs are created on the X6004.
Remote Server 1 .. 4	<p>Select whether you want to send logs to the syslog servers you configure in the Log Setting screen. For each syslog server choose one of the following options:</p> <ul style="list-style-type: none"> Disable All Logs - Do not send any log events. Enable Normal Logs - Send all logs excluding debug events. Debug logs are used by service technicians and development engineers. Enable All Logs - Send all logs.

Table 107 Report > LOGS > System Log > Log Setting > Active Log Summary

LABEL	DESCRIPTION
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click Cancel to go back to the Log Setting screen without saving your changes.

26.3.2 System Log Configuration

To change your X6004's log settings, click the edit icon of the **System Log** entry in the **Report > LOGS > System Log > Log Setting** screen. The screen appears as shown.

Use the **Log Settings** screen to configure to where the X6004 is to send logs; the schedule for when the X6004 is to send logs and which logs and/or immediate alerts the X6004 is to send.

Figure 206 Report > LOGS > System Log > Log Setting > Edit Internal Log

E-mail Server 1

☐ Active

Mail Server (Outgoing SMTP Server Name or IP Address)

Mail Subject

Send From (E-Mail Address)

Send Log to (E-Mail Address)

Send Alerts to (E-Mail Address)

Sending Log

Day for Sending Log

Time for Sending Log (Hour) (Minute)

☐ SMTP Authentication

User Name

Password

E-mail Server 2

Active Log and Alert

⊗ :Disable All Logs ⊕ :Enable Normal Logs ⊕ :Enable All Logs ⊕ :Enable Alert Log

Log Category	System Log	E-mail Server 1	E-mail Server 2
All Logs	⊗ ⊕ ⊕	⊕ ⊕	⊕ ⊕
IPPBX	⊗ ⊗ ⊗	⊗ ⊗	⊗ ⊗
User	⊗ ⊗ ⊗	⊗ ⊗	⊗ ⊗
myZyXEL.com	⊗ ⊗ ⊗	⊗ ⊗	⊗ ⊗
Default	⊗ ⊗ ⊗	⊗ ⊗	⊗ ⊗

Log Consolidation

☐ Active

Log Consolidation Period (seconds) (10-600)

Apply Cancel

Each field is described in the following table.

Table 108 Report > LOGS > System Log > Log Setting > Edit Internal Log

LABEL	DESCRIPTION
E-mail Server 1/2	You can configure a single e-mail address or two e-mail addresses for sending your logs to.
Active	Select this to activate sending logs to this E-Mail server.
Mail Server	Enter the server name or the IP address of the mail server for the e-mail addresses specified below. If this field is left blank, logs and alert messages will not be sent via e-mail.
Mail Subject	Type a title that you want to be in the subject line of the log e-mail message that the X6004 sends.
Send From	Enter the e-mail address that you want to be in the from/sender line of the log e-mail message that the X6004 sends. If you activate SMTP authentication, the e-mail address must be able to be authenticated by the mail server as well.
Send Log To	Logs are sent to the e-mail address specified in this field. If this field is left blank, logs will not be sent via e-mail.
Send Alerts To	Alerts are sent to the e-mail address specified in this field. If this field is left blank, alerts will not be sent via e-mail.
Log Schedule	<p>This drop-down menu is used to configure the frequency of log messages being sent as E-mail:</p> <ul style="list-style-type: none"> • Daily • Weekly • Hourly • When Log is Full • None. <p>If you select Weekly or Daily, specify a time of day when the E-mail should be sent. If you select Weekly, then also specify which day of the week the E-mail should be sent. If you select When Log is Full, an alert is sent when the log fills up. If you select None, no log messages are sent.</p>
Day for Sending Log	Use the drop down list box to select which day of the week to send the logs.
Time for Sending Log	Enter the time of the day in 24-hour format (for example 23:00 equals 11:00 pm) to send the logs.
SMTP Authentication	SMTP (Simple Mail Transfer Protocol) is the message-exchange standard for the Internet. SMTP enables you to move messages from one e-mail server to another. Select the check box to activate SMTP authentication. If mail server authentication is needed but this feature is disabled, you will not receive the e-mail logs.
User Name	Enter the user name (up to 31 characters) (usually the user name of a mail account).
Password	Enter the password associated with the user name above.
Active Log and Alert	
Log Category	<p>This column displays the source of log events that you can record on the X6004. The categories are:</p> <ul style="list-style-type: none"> • All Logs - all logs generated on the X6004. • IPPBX - all activities related to the PBX functions of the X6004. For example, a an FXS card failure. • User - administrator activity, such as a successful login. • myZyXEL.com - service registration with the myZyXEL.com website • Default - All other logs generated by the X6004. For example, failure to reach a DHCP server.

Table 108 Report > LOGS > System Log > Log Setting > Edit Internal Log

LABEL	DESCRIPTION
System Log	Select whether you want to enable logging and the types of logs to record for each source of logs as described in the Log Category field. The choices are: <ul style="list-style-type: none"> • Disable All Logs - Do not log any events. • Enable Normal Logs - Log all events excluding debug events. Debug logs are used by service technicians and development engineers. • Enable All Logs - Log all events.
E-mail Server 1/2	Select whether you want to send logs to the e-mail address of an administrator you specify in the Log Setting screen. <ul style="list-style-type: none"> • Enable Normal Logs - Select this to send logs to an administrator at the time interval you specify in the Log Setting screen. • Enable Alert Log - Select this to send e-mail alerts to an administrator when emergency, alert or critical level logs are created on the X6004.
Log Consolidation	
Active	Some logs may be so numerous that it becomes easy to ignore other important log messages. Select this check box to merge logs with identical messages into one log.
Log Consolidation Period	Specify the time interval during which the X6004 merges logs with identical messages into one log.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click Cancel to go back to the Log Setting screen without saving your changes.

26.3.3 Edit Syslog Server Settings

Use this screen to edit the remote syslog server settings. To access this screen, click the **Edit** icon of one of the **Remote Server** columns in the **Report > LOGS > System Log > Log Setting** screen.

Figure 207 Report > LOGS > System Log > Log Setting > Edit Remote Log

Log Settings for Remote Server 1

☐ Active

Log Format: ZyXEL VRPT.

Server Address:

Log Facility: Local 1

☒ :Disable All Logs
 ☐ :Enable Normal Logs
 ☐ :Enable All Logs
 ☐ :Enable Alert Log

Log Category	Selection
All Logs	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>
IPPBX	<input type="radio"/> <input type="radio"/> <input type="radio"/>
User	<input type="radio"/> <input type="radio"/> <input type="radio"/>
myZyXEL.com	<input type="radio"/> <input type="radio"/> <input type="radio"/>
Default	<input type="radio"/> <input type="radio"/> <input type="radio"/>

Apply Cancel

Each field is described in the following table.

Table 109 Report > LOGS > System Log > Log Setting > Edit Remote Log

LABEL	DESCRIPTION
Log Settings for Remote Server	
Active	Click Active to enable syslog logging.
Server Address	Enter the server name or IP address of the syslog server that will log the selected categories of logs.
Log Facility	Select a location from the drop down list box. The log facility allows you to log the messages to different files in the syslog server. Refer to the documentation of your syslog program for more details.
Log Category	Select the categories of logs that you want to record. The categories are: <ul style="list-style-type: none"> • All Logs - all logs generated on the X6004. • IPPBX - all activities related to the PBX functions of the X6004. • User - administrator activity, such as a successful login. • myZyXEL.com - service registration with the myZyXEL.com website • Default -
Selection	Select which logs to send to this syslog server. Choose one of the following options: <ul style="list-style-type: none"> • Disable All Logs - Do not send any log events. • Enable Normal Logs - Send all logs excluding debug events. Debug logs are used by service technicians and development engineers. • Enable All Logs - Send all logs.
Apply	Click Apply to save your changes back to the X6004.
Cancel	Click Cancel to go back to the Log Setting screen without saving your changes.

Call Detail Record (CDR)

This chapter shows you how to collect and manage Call Detail Records (CDRs) on the X6004.

27.1 CDR Overview

Call Detail Records (CDRs) are telephone records containing details such as the time of call, duration of call, source telephone number and so on. The X6004 has a built in CDR database that automatically stores calls made to or from its extensions. You can search the CDR database to find out details about the calls made within your organization. You can also use an external database to store CDRs.

27.1.1 Local CDR Database

The local CDR database has limited capacity and when it is full it empties its contents into a compressed file of the call records. This file is referred to as an “Aged File”. An “Aged File” can be forwarded to an e-mail address where it can be reviewed at a later time or it can be deleted from the system. Whether you delete or send the full aged file to an administrator, the X6004 continues to record telephone call details in an empty CDR database.

Another way to deal with the limited capacity on the local CDR database of the X6004 is to actively manage the CDR database. This requires you to create backups of the CDR database and send them to an administrator via e-mail.

27.1.1.1 Viewing Aged Files

An “Aged File” is a compressed file with the extension “.tgz”. “.tgz” files can be uncompressed with data compression utilities for example WinRAR or WinZIP. The result of decompressing this file are three files which can then be managed via a MySQL Database Management System (DBMS). The three files are:

- **cdr.MYD** - a MySQL data file.
- **cdr.MYI** - a MySQL index file.
- **cdr.frm** - a MySQL format file.

27.1.2 CDR Database Management via MySQL

MySQL is a database management system based on SQL (Structured Query Language). You can configure a MySQL server to collect CDRs from the X6004 and expand the capacity of telephone records you can collect and review.

27.2 CDR Management Screen

Use this screen to set up an external server to collect CDR information. You can also configure an administrator e-mail address to send alerts and CDR files for later viewing. Click **Report > LOGS > CDR > Management** to view the screen as shown next.

Figure 208 Report > LOGS > CDR > Management

Each field is described in the following table.

Table 110 Report > LOGS > CDR > Management

LABEL	DESCRIPTION
Management	
Database Usage	The X6004 can collect around 20000 records on the local CDR database. This field indicates the total number of records currently held by the database. When the local database is full, the X6004 removes all the CDRs from the local database and creates an “Aged File” (a compressed file containing all the CDRs). Use the Aged File field to specify how to deal with the compressed file containing the CDRs.
Generate CDR	Check the internal call checkbox if you want the X6004 to record internal calls. Internal calls are calls from one extension to another extension configured on the X6004. Uncheck this box if you do not want the X6004 to record internal calls.
Alert	Check the enable checkbox if you want the X6004 to send an email alert to the e-mail address specified in the E-mail Address field when the CDR file is half full.
Aged File	Specify how to deal with CDR files when they are full. Choose mail to admin. to send the CDR file to the e-mail address specified in the E-mail Address field or drop to delete the file from the system.
E-mail Address	Type the e-mail address to which you want to send the alerts indicating that the CDR file is half full. This is also the e-mail address to which complete CDR files are sent when they are full (reach approximately 20000 records).
Database Location	Use this section to specify the location and login credentials for a MySQL server that collects the CDR information from the X6004.
Remote Server	Check the Remote Server box and the X6004 sends a record of each call to the remote MySQL server you specify in the Server field. Uncheck this box if you do not want to use a remote server to collect the CDR information.

Table 110 Report > LOGS > CDR > Management

LABEL	DESCRIPTION
Server	Type the IP address or the domain name of the server to which you want to send your CDR files. Then type the port number on which the remote server receives records of telephone calls from the X6004.
Username	Type the username of the account set up on a remote server to which you want to send your CDR files.
Password	Type the password of the account set up on a remote server to which you want to send your CDR files.
Apply	Click the Apply button to save your changes.

27.3 Backup List Screen

Use this screen to backup CDR files, delete existing backups of CDR files and mail CDR files to an administrator email address.

Figure 209 Report > LOGS > CDR > Backup List

Each field is described in the following table.

Table 111 Report > LOGS > CDR > Backup List

LABEL	DESCRIPTION
Backup File List	If you have a ZyStack configured using multiple X6004s, then specify the X6004 for which you want to create a backup file of the CDRs.
Filename	<p>This column displays the names of the backup CDR files currently stored on the X6004. Use the check box on the left to specify which files you want to forward or delete. The filename of the CDR takes the following format: “cdr.YYYYMMDDHHMMSS.tgz”</p> <p>Where:</p> <ul style="list-style-type: none"> • cdr - indicates this is a Call Detail Record file. • YYYYMMDD - is the year, month, and day indicating when the backup file was created. • HHMMSS - is the time of the day indicating when the backup file was created in hour, minute, second format. • tgz - indicates that this is a compressed. That can be uncompressed using a compression utility such as WinRAR. The resulting uncompressed files are MySQL database files that can be managed via a MySQL DBMS (Database Management System). See Section 27.1.2 on page 239. <p>Note: The X6004 can store only three CDR backup files at a time. If you create a new backup file when you already have three files created, then the oldest backup file is deleted from the system.</p>

Table 111 Report > LOGS > CDR > Backup List

LABEL	DESCRIPTION
Forward	Check the boxes next to the files you want to forward to the administrator email address and click the Forward button. The files you forward to an administrator are deleted from the X6004.
Delete	If you no longer want to store a CDR file on the X6004 then check the boxes next to the files you want to delete from the X6004 and click the Delete button.
Backup Now	Click the Backup Now button to save a CDR file on the X6004.

27.4 CDR Query Screen

Use this screen to configure search criteria for call records on the X6004. You also use this screen to execute your query and create CDR reports. Click **Report > LOGS > CDR > CDR Query** to view the screen as shown next.

Figure 210 Report > LOGS > CDR > CDR Query

The screenshot shows the 'CDR Query' screen with the following sections:

- Management** tabs: Management, Backup List, CDR Query (selected).
- Query Condition** section:
 - Start Time**: A radio button for a dropdown menu and a 'From' field (2007 / 3 / 7 0 : 0) with a calendar icon. The 'To' field is empty.
 - Direction**: Four checkboxes for 'extension / extension', 'extension / outbound', 'outbound / extension', and 'outbound / outbound'.
 - Call Time**: Two input fields with a '~' separator and a 'seconds' dropdown.
 - Talk Time**: Two input fields with a '~' separator and a 'seconds' dropdown.
 - Caller Group**: An input field, a 'Totally Match' dropdown, and an ellipsis button.
 - Channel**: An input field, a 'Totally Match' dropdown, a 'Both' dropdown, and an ellipsis button.
 - Caller Number**: An input field and a 'Totally Match' dropdown.
 - Dialed Number**: An input field and a 'Totally Match' dropdown.
- Setting Show Items** section: A grid of checkboxes for 'Call Date', 'Called Number', 'Dst. Channel', 'Call Result', 'Caller ID', 'Caller Group', 'Call Time', 'Caller Number', 'Src. Channel', and 'Talk Time'. 'Call Date', 'Called Number', 'Caller Number', and 'Talk Time' are checked.
- Report** button at the bottom.

Each field is described in the following table.

Table 112 Report > LOGS > CDR > CDR Query

LABEL	DESCRIPTION
Query Condition	Use this section to specify your query details.
Start Time	Specify the time period for your query. Choose a specific time period from the drop down list box or fill in the From and To fields with the time range you want to search the call detail record. You can use the pop-up calendar to fill in the date fields for the To and From fields by clicking the buttons and selecting the date.

Table 112 Report > LOGS > CDR > CDR Query (continued)



LABEL	DESCRIPTION
Direction	<p>Specify the types of calls you want to view based on the source and destination of the calls. You can choose one or more of the available source - destination combinations:</p> <ul style="list-style-type: none"> • extension / extension - to view internal calls; those made from one extension to another extension on the X6004. • extension / outbound - to view calls from within your organization made to the outside world via one of the outbound lines. • outbound / extension - to view calls from the outside world to extensions configured on the X6004. • outbound / outbound - to view calls that come in from an outbound line and are routed back to the outside world via another outbound line.
Call Time	<p>Call time is the time from when a caller finishes dialing a number until one of the parties hangs up.</p> <p>Enter the range of seconds, minutes or hours to specify the length of calls that you want to search for. If you leave this field blank, then the length of the call will not be considered as a search criterion, in other words calls of all length duration are displayed unless limited by other search criteria.</p>
Talk Time	<p>Talk time is the time from when a callee picks up an incoming call until one of the parties hangs up.</p> <p>Enter the range of seconds, minutes or hours to specify the length of calls that you want to search for. If you leave this field blank, then the length of the call will not be considered as a search criterion, in other words calls of all length duration are displayed unless limited by other search criteria.</p>
Caller Group	<p>Type the name of the authority group or outbound line group for which you want to search the call detail record. Use the drop down listbox to choose Totally Match, if you want to display only call records that exactly match the criteria you type or select Partially Match, if you want to enter only a part of the group name that you want to search for. Alternatively, use the  button to select the outbound line group or authority group configured on the X6004 that you want to use as your search criterion.</p>
Channel	<p>Type the name of the type of channel for which you want to search the call detail record. The channels can be either FXS extensions, FXO outbound channels, or SIP based connections. Use the drop down listbox to choose Totally Match, if you want to display only call records that exactly match the criteria you type in or select Partially Match if you want to enter only a part of the group name that you want to search for. Alternatively, use the  button to select the channel configured on the X6004 that you want to use as your search criterion.</p> <p>Next use the drop down list box to select whether you want to search calls originating from this channel (SRC.), terminating via this channel (Dest.) or both (Both).</p>
Caller Number	<p>Type the telephone number of the caller for which you want to search the call detail record. Use the drop down listbox to choose Totally Match, if you want to display only call records that exactly match the criteria you type in or select Partially Match, if you want to enter only a part of the telephone number to search for.</p>
Dialed Number	<p>Type the dialed telephone number of the callee for which you want to search the call detail record. Use the drop down listbox to choose Totally Match, if you want to display only call records that exactly match the criteria you type in or select Partially Match, if you want to enter only a part of the telephone number to search for.</p>

Table 112 Report > LOGS > CDR > CDR Query (continued)

LABEL	DESCRIPTION
Setting Show Items	<p>Use this section to specify which details you want to display in the CDR report for each telephone call record displayed. You can choose to display the following details:</p> <ul style="list-style-type: none"> • Call Date - The date and time the call took place (start time). • Called Number - The telephone number of a callee. • Dst. Channel - The type of outbound line group, if the callee is outside your organization or the extension type (SIP or FXS) if the callee is within your organization. • Call Result - "Answered" if the call was completed successfully, "Not Answered" if the call was not answered. • Caller ID - The username associated with the extension that partook in the call. • Caller Group - The authority group of the extension that partook in the call or the outbound line group used to make the call. • Call Time - The total duration of the call from the time the ringing started until one of the parties hung up. • Caller Number - The telephone number from which the call originated from. • Src. Channel - the interface type (FXS, FXO or SIP) and name from which this call originated. • Talk Time - The total time of the call from the time the callee picked up the call until one of the parties hung up.
Report	Click the Report button to display your query results in a report window. Your Internet browser opens up a new window with the query results.

27.4.1 CDR Report Screen

The **CDR Report** screen displays the results of the searches you make in the **CDR Query** screen. Specify your search criteria and click the **Report** button in the **CDR Query** screen to view the screen as shown next.

Figure 211 Report > LOGS > CDR > CDR Query > Report

<div> <div>1 / 1</div> <div>Lines/Page : 20</div> <div>Total : 1</div> </div>					
#	Call Date ▲	Caller ID	Caller Number	Called Number	Caller Group
1	2007-03-06 17:40:15	"1004" <1004>	1004	h	ag_default

Each field is described in the following table.

Table 113 Report > LOGS > CDR > CDR Query > Report

LABEL	DESCRIPTION
Left / Right	Use the Left and Right icons to change the page you want to view (if the report has more than one page). Alternatively, use the drop down list box to select the page you want to view.
Lines/Page	Specify how many lines you want to display on each page of the report.
Total	This field displays the total pages created by this report.
Report Output Fields	The format of your report depends on the criteria you select in the Report > LOGS > CDR > CDR Query page. See Section 27.4 on page 242 for explanation of all criteria.

Maintenance

This chapter shows you how to create and manage administrator accounts on the X6004.

28.1 Administrator Accounts

The X6004 has a default administrator account, named “admin”. You can also configure up to four additional accounts with different privilege levels on the X6004. The X6004 supports the following types of accounts:

- **Full admin** - This account can perform all configuration changes.
- **Debug admin** - This account has the same privilege level as the full admin account. This type of account may be assigned to service technicians to perform additional diagnostics on the X6004.
- **Read only** - This account can only view settings on the X6004.

28.2 Administrator Account Screen

Use the **Administrator Username/Password** screen to change the password of the currently logged in administrator. Click **Maintenance > Administrator Username/Password** to view the screen as shown next.

Figure 212 Maintenance > Administrator Username/Password

The screenshot shows a web interface for the 'admin Username/Password Setup'. It features four input fields: 'Old Password', 'Username', 'Password', and 'Confirm Password'. At the bottom right, there are 'Apply' and 'Cancel' buttons.

Username/Password	
admin Username/Password Setup	
Old Password :	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
Confirm Password	<input type="text"/>
<div>Apply Cancel</div>	

Each field is described in the following table.

Table 114 Maintenance > Administrator Username/Password

LABEL	DESCRIPTION
Old Password	Type the existing password for the currently logged in administrator account.
Username	Type the new username of the currently logged in administrator account. You can use up to 25 alphanumeric characters. Spaces are not allowed and the first character must be a letter.
Password	Type a new password for the currently logged in administrator account. You can use up to 32 alphanumeric characters and spaces are not allowed.
Confirm Password	Retype the new password for the currently logged in administrator account.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to begin configuring the fields again.

28.3 Administrator List Screen

Use this screen to manage administrator accounts on the X6004. To access this screen, click **Maintenance > Administrator List**.

Figure 213 Maintenance > Administrator List

The screenshot shows the 'Administrator list' screen. At the top, there is a header bar with the title 'Administrator list'. Below the header, there is a table with the following columns: Username, Description, Rank, and a column for actions (Add, Edit, Delete). The table contains five rows of administrator accounts. Each row has a checkbox in the first column, followed by the Username, Description, Rank, and a column with icons for Add, Edit, and Delete. The table is surrounded by a border, and there are 'Delete' buttons at the top left and bottom left of the table area.

	Username	Description	Rank	
<input type="checkbox"/>	Jeffrey	Jeffrey	Debug admin	
<input type="checkbox"/>	admin	1234	Full admin	
<input type="checkbox"/>	john	john	Debug admin	
<input type="checkbox"/>	rick	rick	Debug admin	
<input type="checkbox"/>	steve	steve	Debug admin	

Each field is described in the following table.

Table 115 Maintenance > Administrator List

LABEL	DESCRIPTION
Administrator List	
Delete	Check the Delete box and click Delete to remove this account from the X6004.
Username	This field displays the username of an administrator account on the X6004.
Description	This field displays the description of an administrator account on the X6004.

Table 115 Maintenance > Administrator List

LABEL	DESCRIPTION
Rank	This field displays the rank of an administrator account on the X6004. This field displays: <ul style="list-style-type: none"> Full admin - if this account is allowed to perform all configuration changes on the X6004. Debug admin - If this account is allowed to perform all configuration changes on the X6004. This type of account is reserved for use by service technicians. Read only - if this account is only able to view configuration details on the X6004.
Add / Edit / Delete	Click Add to configure a new administrator account on the X6004. Click Edit to edit an existing administrator account on the X6004. Click Delete to remove an administrator account from the X6004.

28.3.1 Add an Administrator

Use this screen to create new administrator accounts. To access this screen, click **Maintenance > Administrator List > Add**.

Figure 214 Maintenance > Administrator List > Add

The screenshot shows a web interface for adding a new administrator. It features a header 'Add admin' and a sub-header 'Create a new administrator'. Below these are five labeled input fields: 'Username', 'Password', 'Confirm Password', 'Description', and 'Rank'. The 'Rank' field is a dropdown menu with 'Read only' selected. At the bottom right, there are 'Apply' and 'Cancel' buttons.

Each field is described in the following table.

Table 116 Maintenance > Administrator List > Add

LABEL	DESCRIPTION
Create a new administrator	
Username	Type a username for this administrator. You can use up to 25 alphanumeric characters. Spaces are not allowed. The first character must be a letter.
Password	Type a password for this administrator account. You can use up to 32 alphanumeric characters and spaces are not allowed.
Confirm Password	Retype the new password for this administrator account.
Description	Type a short description for this administrator account. You can use up to 32 alphanumeric characters. Spaces are allowed.
Rank	Select the rank you want this administrator account to have. You can select: <ul style="list-style-type: none"> Full admin - to allow this account to perform all configuration changes on the X6004. Debug admin - to allow this account to perform all configuration changes on the X6004. This type of account is reserved for use by service technicians. Read only - to allow this account to only be able to view configuration details on the X6004.

Table 116 Maintenance > Administrator List > Add

LABEL	DESCRIPTION
Apply	Click this to save your changes.
Cancel	Click this to return to the previous screen without saving your changes.

28.3.2 Edit an Administrator Account

Use this screen to change the password, description or rank of an existing administrator account. To access this screen, click **Maintenance > Administrator List > Edit**.

Figure 215 Maintenance > Administrator List > Edit

The screenshot shows a web interface titled 'Edit admin' with a subtitle 'Edit admin administrator profile'. It contains four input fields: 'Password' (masked with four asterisks), 'Confirm Password' (masked with four asterisks), 'Description' (containing the text 'admin'), and 'Rank' (a dropdown menu showing 'Level : Full admin'). At the bottom right, there are 'Apply' and 'Cancel' buttons.

Each field is described in the following table.

Table 117 Maintenance > Administrator List > Edit

LABEL	DESCRIPTION
Edit administrator profile	
Password	Type a new password for this administrator account. You can use up to 32 alphanumeric characters. Spaces are not allowed.
Confirm Password	Retype the new password for this administrator account.
Description	Type a short description for this administrator account. You can use up to 32 alphanumeric characters. Spaces are allowed.
Rank	Select the rank you want this administrator account to have. You can select: <ul style="list-style-type: none"> Full admin - to allow this account to perform all configuration changes on the X6004. Debug admin - to allow this account to perform all configuration changes on the X6004. This type of account is reserved for use by service technicians. Read only - to allow this account to only be able to view configuration details on the X6004.
Apply	Click this to save your changes.
Cancel	Click this to return to the previous screen without saving your changes.

Diagnostics

This chapter shows you how to collect diagnostic information and capture network traffic for analysis from the X6004.

29.1 Diagnostics Overview

The X6004 comes with advanced diagnostic tools to help a service technician troubleshoot problems or simply to ensure that everything is running smoothly on the X6004. This section describes how to collect the information from the X6004 and gives a brief description on the information you collect. You can collect the following information from the X6004:

- Current status information - the X6004 executes debugging commands and saves the results in a compressed file. You can then submit the results to a service technician or view some of the results via a spreadsheet application (for example Excel or WordPad). See the Command Reference Guide for more information regarding the commands executed to collect current status information. The resulting file can be uncompressed with data compression utilities for example WinRAR. The resulting uncompressed files are:
 - **diag.ezsh.dbg** - contains the results of executing diagnostic and debug log commands on the X6004. This file can be opened using a spreadsheet application such as Excel or a text editor like WordPad.
 - **system.bin** - contains encrypted information which can only be diagnosed by a service engineer. Customer support may ask you to submit this file for diagnostic purposes.
- Network traffic information - the X6004 logs traffic passing through its interfaces. You can specify the interface, protocol or a specific host to capture the traffic from. The logs are saved in a Generic Network Capture Document (**.cap** file extension) and can be viewed via a network analyzer such as Ethereal. These files can diagnose communication problems between the X6004 and other network devices. A service technician may ask you to perform a packet capture when troubleshooting connectivity problems on your network.

29.1.1 Information Collect

Use this screen to capture running configuration details on the X6004. You can download and save the configuration detail file in a compressed file format. A service technician may request that you send this file for troubleshooting. Click **Maintenance > Administration > Diagnostic > Information Collect** to view the screen as shown.

Figure 216 Maintenance > Administration > Diagnostic > Information Collect

Each field is described in the following table.

Table 118 Maintenance > Administration > Diagnostic > Information Collect

LABEL	DESCRIPTION
Machine ID	If you have more than one X6004 configured in a ZyStack, select the one from which you want to collect information.
Collect Now	Click Collect Now to capture the configuration details of the X6004. Note: It takes about 1 minute to perform the data collection. Do not try to browse to other screens while the capture is in progress.
Filename	This field displays the name of the compressed file which holds the running configuration details. The file naming convention is: diaginfo-YYYYMMDD.tar.gz , where YYYY is the year, MM is the month and DD is the day of the month on which the capture took place. The file can be uncompressed with variety of data compression utilities for example WinRAR or WinZIP.
Last Modified	This field displays the date and time when the information was retrieved from the X6004.
Size	This field displays the size of the file.
Download	Click Download to save the file to your computer.

29.1.2 Packet Capture Screen

Use this screen to log network traffic going through the X6004 LAN or WAN interface. Click **Maintenance > Administration > Diagnostic > Packet Capture** to view the screen as shown.

Figure 217 Maintenance > Administration > Diagnostic > Packet Capture

The screenshot shows the 'Packet Capture' configuration interface. It includes a 'Packet Capture' section with the following fields:

- Machine ID:
- Interface:
- Host:
- Protocol:
- Stop capture after: Packets(1~3000)
- Stop capture after: Sec.(1~600)

A 'Capture Now' button is located below the 'Stop capture after' fields. Below this is a 'File Download' section with fields for 'Filename:', 'Last Modified:', and 'Size:', followed by a 'Download' button.

Each field is described in the following table.

Table 119 Maintenance > Administration > Diagnostic > Packet Capture

LABEL	DESCRIPTION
Machine ID	If you have more than one X6004 configured in a ZyStack, select the one from which you want to collect information.
Interface	Choose the interface for which you want to log network traffic.
Host	Optionally, limit the capture of information to communication with a specific network device. Enter the IP address of the network device that the X6004 is communicating with. You can also enter the IP address of the X6004 itself, in which case, the X6004 only collects information where the destination or source IP matches that of the X6004.
Protocol	Specify the protocol type which you want to capture information on. You can choose TCP , UDP , ICMP or select All to capture all IP traffic going through the X6004.
Stop capture after .. Packets	Specify how many packets you want to collect before ending the packet capture. If you select to limit the capture by the number of packets and by total time of the capture, then the capture session will end when the time limit is reached. Note: You must specify either a time limit or a total number of packets limit for the data capture.
Stop capture after .. Sec.	Specify how long a packet capture session should last. If you select to limit the capture by the number of packets and by total time of the capture, then the capture session will end when the time limit is reached. If you do not specify any limits for the capture, then the capture will last for the maximum time allowed (600 seconds). Note: You must specify either a time limit or a total number of packets limit for the data capture.

Table 119 Maintenance > Administration > Diagnostic > Packet Capture

LABEL	DESCRIPTION
Capture Now	Click Capture Now to start collecting network traffic information from the X6004. Note: It may take several minutes to perform the data collection. Do not try to browse to other screens while the capture is in progress.
Filename	This field displays the name of the .cap file which holds the packet capture data. The file naming convention is: X6004-YYYYMMDD.cap , where YYYY is the year, MM is the month and DD is the day of the month on which the capture took place.
Last Modified	This field displays the date and time when the information was collected from the X6004.
Size	This field displays the size of the file.
Download	Click Download to save the file to your computer.

System File Maintenance

This chapter shows you how to upload new firmware and manage the configuration file on the X6004.

30.1 Configuration File Maintenance

The X6004 allows you to save a configuration file to your local computer. You should create a backup file of your configuration when you have configured all your settings and the X6004 is functioning properly. Restore the configuration if you are experiencing problems with the X6004.



The information related to administrator accounts on the X6004 is not saved when you create a backup configuration file.

When you restore a configuration file on the X6004, you do not change the currently configured administrator accounts on the X6004.



You must restart the X6004 after you restore a configuration file for the restored settings to be applied to the X6004.

30.1.1 Backup & Restore Screen

Use this screen to back up or restore a configuration on the X6004. You can also use this screen to reset the X6004 to the factory default settings. To access this screen, click **Maintenance > Backup & Restore**.

Figure 218 Maintenance > Backup & Restore

Backup & Restore

Backup Configuration

Click Backup to save the current configuration of your system to your computer.

Restore Configuration

To restore a previously saved configuration file to your system, browse to the location of the configuration file and click Upload.

File path :

Back to Factory Defaults

Click Reset to clear all user-entered configuration information and return to factory defaults. After resetting, the

- Username will be admin
- Password will be 1234
- LAN IP address will be 192.168.1.12

Each field is described in the following table.

Table 120 Maintenance > Backup & Restore

LABEL	DESCRIPTION
Backup Configuration	
Backup	<p>Click this to save the X6004's current configuration to a file on your computer. Once your device is configured and functioning properly, it is highly recommended that you back up your configuration file before making configuration changes. The backup configuration file is useful if you need to return to your previous settings.</p> <p>Note: The administrator account information is not saved during the backup process.</p>
Restore Configuration	
File Path	Enter the location of the file you want to upload, or click Browse... to find it.
Browse	Click this to find the file you want to upload.
Upload	<p>Click this to restore the selected configuration file. Do not turn off the X6004 while configuration file upload is in progress. After the configuration file is uploaded successfully a message appears at the bottom of the screen "Info : Restore success. Please restart the system."</p> <p>Note: You must restart the X6004 to apply the settings from the restored configuration file.</p> <p>When you restore a configuration file on the X6004, you do not change the currently configured administrator accounts on the X6004.</p>
Back to Factory Defaults	
Default	Click this to return the X6004 to its factory defaults.

30.2 Firmware Upgrade Screen

The X6004 accepts two kinds of firmware files. The first type of file has a “.bin” extension. This type of file contains instructions on how the device drivers interact with the main processing unit of the X6004. In other words, when you upload a new “.bin” file you might not see any changes in the GUI of the X6004, but you may experience improved performance. The second type of file has a “.rom” extension. This type of file contains functional instructions for the X6004. When you upload this type of file, you may see new features or changes in the GUI of the X6004.

Find firmware at www.zyxel.com. Read the firmware release notes before uploading the firmware files. The upload process uses HTTPS and may take several minutes. After a successful upload, the system reboots.



Do not turn off the device while firmware upload is in progress!

Use this screen to view the current firmware version on the X6004 and to update the X6004 if you have newer firmware. To access this screen, click the **Maintenance > Firmware Upgrade**.

Figure 219 Maintenance > Firmware Upgrade

Each field is described in the following table.

Table 121 Maintenance > Firmware Upgrade

LABEL	DESCRIPTION
Information	This section displays information about the firmware currently installed on the X6004.
Boot Module:	This field indicates the version of the boot module installed on the X6004. The boot module is software that tells the X6004 how to install and run the firmware. Each firmware release only works when the proper boot module is installed on the X6004.
Current Version	This field indicates the firmware version number.
Released Date	This field indicates the date and time that the currently installed firmware on the X6004 was released.
Select Upload File	Use this section to upload new firmware to the X6004.
File Path	Enter the location of the .bin or .rom file you want to upload, or click Browse... to find it. You must decompress compressed (.zip) files before you can upload them.

Table 121 Maintenance > Firmware Upgrade

LABEL	DESCRIPTION
Browse...	Click this to find the .bin or .rom file you want to upload.
Upload	Click this to begin uploading the selected file. This may take several minutes. Note: Do not turn off the device while firmware upload is in progress!

30.3 FTP Command Line

This section shows some examples of uploading files to the X6004 using FTP commands. First, understand the filename conventions.

30.3.1 Filename Conventions

The following types of files can be uploaded to the X6004:

- Base firmware - contains basic operating instructions for the X6004. This file has a “.bin” extension, for example “100AVA1b1.bin”.
- Main firmware - contains the main software features of the X6004. This file has a “.rom” extension, for example “100AVA1b1.rom”.
- Factory Default Settings - contains the default configuration of the X6004. This file has a “.romd” extension, for example “100AVA1b1.romd”.
- Firmware and Configuration - combines all of the files listed above into a single uploadable file. This file has a “.binromromd” extension, for example “100AVA1b1.binromromd”.

Regardless of which file you want to upload to the X6004, you must first rename it to the internal firmware file name on the X6004: **ZLD-current**.

30.3.1.1 Example FTP Commands

Do the following to upload the firmware and configuration file to the X6004:

- 1 Rename the file you want to upload to ZLD-current and place it in the directory from which you launch your FTP session. In our example this is the root directory “C:\”.
- 2 Launch the FTP client on your computer. For example, from the command prompt type ftp, followed by a space and the IP address of your X6004.
- 3 Type your username and press [ENTER] when prompted (the default is “admin”).
- 4 Enter your password as requested (the default is “1234”).
- 5 Enter bin to set transfer mode to binary.
- 6 Use put to transfer files from the computer to the X6004, for example, put ZLD-current transfers the firmware and configuration that you renamed to **ZLD-current** to the X6004.
- 7 The X6004 uploads the file and automatically reboots. The FTP session with the X6004 is automatically terminated.

This is a sample FTP session showing the transfer of the **ZLD-current** file to the X6004:

```
C:\>ftp 172.23.37.201
Connected to 172.23.37.201.
220 ProFTPD 1.2.10 Server (ProFTPD Default Installation)
[172.23.37.201]
User (172.23.37.201:(none)): admin
331 Password required for admin.
Password: ****
230 User admin logged in.
ftp> bin
200 Type set to I
ftp> put ZLD-current
200 PORT command successful
150 Opening BINARY mode data connection for ZLD-current
226-path /etc/zyxel/ftp/.tmp/ZLD-current
226-firmware verifying...
226-firmware updating...
226-Please Wait about 5 minutes!!
226-Do not poweroff or reset,
226-system will reboot automatically after finished updating.
226 Transfer complete.
226-copy_firmware:file /etc/zyxel/ftp/.tmp/ZLD-current
226-done
226-Receive firmware success!
226-System reboot automatically!
```



Be sure to upload the correct model firmware as uploading the wrong model firmware may damage your device.

30.3.2 GUI-based FTP Clients

The following table describes some of the commands that you may see in GUI-based FTP clients.

Table 122 General Commands for GUI-based FTP Clients

COMMAND	DESCRIPTION
Host Address	Enter the address of the host server.
Login Type	<p>Normal. The server requires a unique User ID and Password to login. The X6004 requires Normal login type.</p> <p>Anonymous. This is when a user I.D. and password is automatically supplied to the server for anonymous access. Anonymous logins will work only if your ISP or service administrator has enabled this option.</p>
Transfer Type	Transfer files in either ASCII (plain text format) or in binary mode. Configuration and firmware files should be transferred in binary mode.
Initial Remote Directory	Specify the default remote directory (path).
Initial Local Directory	Specify the default local directory (path).

myZyXEL.com

This chapter shows you how to register your X6004 and subscribe to services available at myZyXEL.com.

31.1 myZyXEL.com Overview

myZyXEL.com is ZyXEL's online services center where you can register your X6004 and manage subscription services available for the X6004.



You need to create an account before you can register your device and activate the services at myZyXEL.com.

You can directly create a myZyXEL.com account, register your X6004 and activate a service using the **REGISTRATION** screen. (Alternatively, go to <http://www.myZyXEL.com> with the X6004's serial number and WAN MAC address to register it.) Refer to the web site's on-line help for details.



To activate a service on a X6004, you need to access myZyXEL.com via the X6004.

31.1.1 Subscription Services Available on the X6004

At the time of writing, the following services are available on the X6004:

- **ZyXEL softphone** - ZyXEL offers a software based SIP IP phone that you can install on the following operating system computers: Microsoft Windows 2000 and Microsoft Windows XP

After installation you can connect to the X6004 and use a computer to make calls via the X6004. Refer to the documentation that came with your ZyXEL softphone.



At the time of writing ZyXEL offers the V100 SoftPhone. Contact your vendor for more information.

- **SIP extension registration** - the number of SIP extensions you can create on the X6004 is limited by your service subscription. In order to add more SIP extensions to the X6004, you need to register additional extensions via myZyXEL.com.

31.2 Registration

Use this screen to register your X6004 with myZyXEL.com and activate a service, such as a softphone license. Click **Maintenance > License Control > Registration** in the navigation panel to open the screen shown next.

Figure 220 Maintenance > License Control > Registration

Each field is described in the following table.

Table 123 Maintenance > License Control > Registration

LABEL	DESCRIPTION
Device Registration	If you select Existing myZyXEL.com account , only the User Name and Password fields are available.
New myZyXEL.com account	If you haven't created an account at myZyXEL.com, select this option and configure the following fields to create an account and register your X6004.
Existing myZyXEL.com account	If you already have an account at myZyXEL.com, select this option and enter your user name and password in the fields below to register your X6004.
User Name	Enter a user name for your myZyXEL.com account. The name should be between 6 ~ 20 alphanumeric characters. Underscores are allowed but spaces are not.
Check	Click this button to check with the myZyXEL.com database to verify the user name you entered has not been used.

Table 123 Maintenance > License Control > Registration

LABEL	DESCRIPTION
Password	Enter a password of between 6 ~ 20 alphanumeric characters. Underscores are allowed but spaces are not.
Confirm Password	Enter the password again for confirmation.
E-Mail Address	Enter your e-mail address. You can use up to 80 alphanumeric characters (periods and the underscore are also allowed) without spaces.
Country	Select your country from the drop-down box list.
Apply	Click this to save your changes.

31.3 Service

Use the **Service** screen to register and enter your license key information (provided in the box with your X6004). You can also view the services to which you currently subscribe. Click **Maintenance > License Control > Service** to open the screen as shown next.



If you restore the X6004 to the default configuration file or upload a different configuration file after you register, click the **Service License Refresh** button to update license information.

Figure 221 Maintenance > License Control > Service

Service Management	
Service	Quantity
Extension Node Number	16
Soft Phone Node Number	0

License Upgrade

License Key

(Sync with myZyXEL.com to download license Info.)

Each field is described in the following table.

Table 124 Maintenance > License Control > Service

LABEL	DESCRIPTION
Service Management	Use this section to view details about the services you are subscribing to.
Service	This field displays the name of the service available on the X6004.
Quantity	This field displays the number of licenses you have registered for a each service.
License Upgrade	Use this section to update your license information.

Table 124 Maintenance > License Control > Service

LABEL	DESCRIPTION
License Key	Enter your license key (provided in the box with your X6004) and click Update to activate or extend a standard service subscription.
Service License Refresh	Click this button to renew service license information (such as the license key, registration status and expiration date).

31.4 License Status

Use this screen to view the registration status of your subscription services. Click **Maintenance > License Control > License Status** to open the screen as shown next.

Figure 222 Maintenance > License Control > Service

Registration	Service	License Status
License Status		
Machine ID: IPPBX_001 (Unregistered)		
Service		Quantity
Extension Number		16
Soft Phone Number		0

Each field is described in the following table.

Table 125 Maintenance > License Control > Service

LABEL	DESCRIPTION
License Status	
Machine ID	This field displays the name (automatically assigned to the X6004) as well as the registration status (Unregistered or Registered) of the X6004.
Service	This field displays the name of the service available on the X6004.
Quantity	This field displays the number of licenses you have registered for a each service.

PART V

Web Portal and IVR

Web Portal (265)

Interactive Voice Response (IVR) System (275)

Web Portal

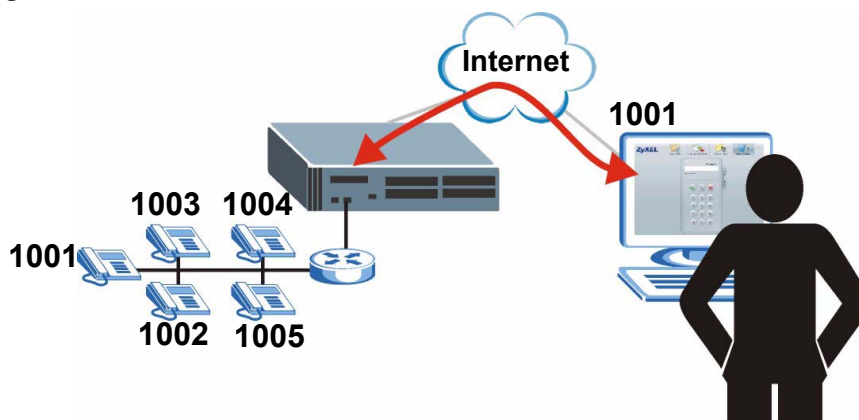
This chapter shows you how to use the web portal to make calls via the web phone and manage settings for individual users.

32.1 Web Portal Overview

The web portal is a HTML-based phone as well as a management tool that allows users to manage some of the settings related to their telephone extension. Each extension created on the X6004 has an associated account which allows it to login to the web portal. When you login to the web portal you can pick up and make calls via your browser.

The web portal can be used by members of your organization who are working away from the office. As long as they have a reliable Internet connection, they can login to the web portal and answer and make calls from the same extension as they have in the office. For example, a user working from home, can log into the web portal with their desk phone extension (1001) and use the HTML-based phone to call extension 1002. He can also receive calls directed to extension 1001.

Figure 223 Web Portal Overview



32.2 Web Portal Login

- 1 Start your web browser.
- 2 Type “https://” and the IP address of the X6004 (for example, the default LAN IP address is 192.168.1.12) in the Location or Address field. Press [ENTER].

- 3 The login screen appears. Enter your extension number and the associated Web password in the upper part of the login screen and click **Login**.



The web password is set up by the administrator when the extension is initially created. See [Chapter 14 on page 125](#).

Figure 224 Web Portal: Login

32.3 Account Settings

Use this screen to manage the passwords associated with your extension. To access this screen, click **Peer info.** in the web portal. This is also the first screen you see when you login to the web portal.



Some of the fields are not applicable for FXS extensions and do not display when analog phone users log into the personal web portal.

Figure 225 Peer Info.

The screenshot shows the ZyXEL web portal interface. At the top, there are navigation icons for Peer Info, Forward/Block, Voice Mail, and Web Phone. The main content area is titled "SIP Peer 1001 configuration and information". It contains the following fields:

- Group: Sales
- SIP Auth. User Name: 1001
- SIP Auth. Password: [masked] (Confirm [masked])
- Web/IVR/VM PIN Code: [masked] (Confirm [masked])

At the bottom of the form are "Apply" and "Reset" buttons. The footer of the page reads "(C) Copyright 2006 by ZyXEL Communications Corp."

Each field is described in the following table.

Table 126 Peer Info.

LABEL	DESCRIPTION
Group	This is a read-only field showing the authority group this extension belongs to.
SIP Auth. User Name	This is a read-only field showing the SIP user name associated with this extension. This field is not available for FXS extensions on the X6004.
SIP Auth. Password	Use these fields to change the SIP password associated with this extension. Type and retype the new password for this extension. This is the password you will need to enter when registering a SIP phone with the X6004. This field is not available for FXS extensions on the X6004.
Web/IVR/VM PIN Code	Use these fields to change the PIN (Personal Identification Number) you need to enter when accessing the web portal, Interactive Voice Response system or Voice Mail. Type and retype the new PIN.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to begin configuring the fields again.

32.4 Call Forwarding and Blocking

Use this screen to set up call forwarding and call blocking rules for your extension. To access this screen, click **Forward/Block** in the web portal.

Figure 226 Forward/Block

Each field is described in the following table.

Table 127 Forward/Block

LABEL	DESCRIPTION
Call Forward Setting	Use this section to configure call forwarding settings for your extension.
Office Hours	The X6004 has separate rules for call forwarding during office hours than after office hours. The time you configure specifies the office hours for this extension and affects call forwarding during those office hours.
Office Hours	Specify the days of the week you want to configure as working days for this extension.
Time	Specify the time range in 24 hour format for the office hours.
DND (Do Not Disturb)	Select Enable and the X6004 will not forward calls to your extension. Click on White List to configure telephone numbers which ignore whether you have DND turned on or off. See Section 32.4.1 on page 269 . Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
Blind Forward	Select Enable and specify an extension. The X6004 will forward all incoming calls to that extension. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
Busy Forward	Select Enable and specify an extension. The X6004 will forward all incoming calls to that extension when your phone is in use. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.

Table 127 Forward/Block

LABEL	DESCRIPTION
No Answer Forward	Select Enable and the X6004 will forward all incoming calls to the extensions you specify when you do not answer the phone within the default ring time. The default ring time is configured in the Configuration > PBX > Server Configuration > Global Set screen. Click Find Me List to specify a list of extensions that the X6004 will forward incoming calls to. See Section 32.4.2 on page 270 . Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
After Office Hours	These fields specify how to treat calls to your extension that occur after office hours. Select Enable and specify an extension. The X6004 will forward all incoming calls to that extension. Select Voice Mail and the X6004 will forward calls directly to voice mail. Select Disable to turn this feature off for this extension.
Call Blocking Setting	Use this section to configure call blocking settings for your extension.
Black List	Select Enable and the X6004 will block all incoming calls from extensions that you specify as blacklisted. Click the Black List button to configure phone numbers that you want to block from calling you. See Section 32.4.3 on page 271 . Select Disable to turn this feature off for this extension.
Block the calls without Caller ID	Select Enable and the X6004 will block all incoming calls from phone that do not send caller ID.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to begin configuring the fields again.

32.4.1 DND White List

Use this screen to edit the **DND White List** for your extension. The X6004 will forward calls to these extensions even if you have DND enabled. To access this screen, click the **DND White List** button in the **Forward/Block** screen.

Figure 227 Forward/Block > DND White List

The screenshot displays the ZyXEL web portal interface for the 'DND White List' configuration. At the top, there is a navigation bar with the ZyXEL logo and four icons: 'Peer Info.', 'Forward/Block', 'Voice Mail', and 'Web Phone'. Below this bar, the page title 'DND White List' is shown. The main content area features a 'Number' input field with an 'Add' button to its right. Below the input field is a large, empty rectangular box, likely for displaying the list of white-listed numbers, with a trash icon to its right. At the bottom of the page, there are 'Apply' and 'Cancel' buttons.

Each field is described in the following table.

Table 128 Forward/Block > DND White List

LABEL	DESCRIPTION
Number	Enter the telephone number you want to allow to call you even if you DND turned on. Click Add and the number you entered displays in the field below.
Delete	Highlight an existing DND White List number and click the Delete icon to remove it from the list.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to return to Forward/Block screen.

32.4.2 Find Me List

Use this screen to edit the **Find Me List** for your extension. This is a list of extensions that the X6004 tries to call if you do not pick up a call. To access this screen, click the **Find Me List** button in the **Forward/Block** screen.

Figure 228 Forward/Block > Find Me List

Each field is described in the following table.

Table 129 Forward/Block > Find Me List

LABEL	DESCRIPTION
Number	Enter the telephone extension you want the X6004 to forward calls to when you do not pick up a call. Click Add and the number you entered displays in the field below.
Priority	Highlight an existing Find Me List extension and use the up arrow to move it up in the list or use the down arrow to move it down in the list. The X6004 will try to forward the call to the extensions in the list in the order they appear from top to bottom. If the topmost extension in the list does not pick up it tries the one below and so on.
Delete	Highlight an existing Find Me List extension and click the Delete icon to remove it from the list.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to return to Forward/Block screen.

32.4.3 Blacklist

Use this screen to edit the **Black List** for your extension. This is a list of phone numbers from which the X6004 will block calls to your extension. To access this screen, click the **Black List** button in the **Forward/Block** screen.

Figure 229 Forward/Block > Black List

Each field is described in the following table.

Table 130 Forward/Block > Black List

LABEL	DESCRIPTION
Number	Enter the telephone number you want to block from calling you when you enable call blocking. Click Add and the number you entered displays in the field below.
Delete	Highlight an existing Black List number and click the Delete icon to remove it from the list.
Apply	Click this to save your changes and to apply them to the X6004.
Cancel	Click this to return to Forward/Block screen.

32.5 Voice Mail Settings

Use this screen to set up the voice mail settings for your extension. To access this screen, click the **Voice Mail** tab in the web portal.

Figure 230 Voice Mail

Each field is described in the following table.

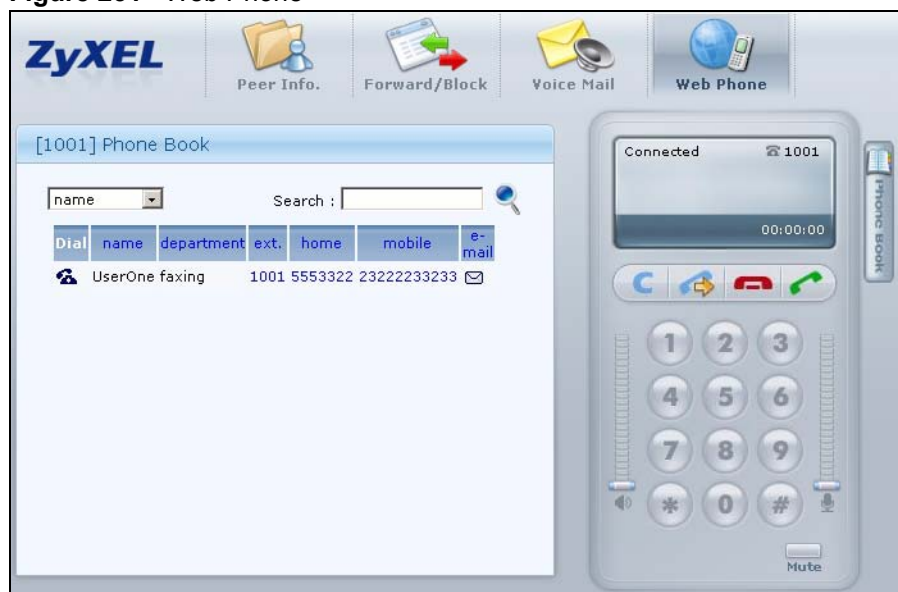
Table 131 Voice Mail

LABEL	DESCRIPTION
Received E-mail Address	Specify the e-mail address you want to forward your voice message notifications to. If you select the Attached Voice File option, then complete voice messages are sent to this e-mail address.
Attached Voice File	Select this feature if you want complete voice messages to be sent to the e-mail address you specified in the Received E-mail Address field.
Delete Voice Mail After Mailed	Check this box to delete voicemail messages stored on the X6004 after they have been e-mailed.
Apply	Click this to save your changes and to apply them to the X6004.
Reset	Click this to begin configuring the fields again.

32.6 Web Phone

Use this screen to make calls from the web phone. To access this screen, click the **Web Phone** tab in the web portal.

Figure 231 Web Phone







Each field is described in the following table.

Table 132 Web Phone

LABEL	DESCRIPTION
Phone Book	Click the Phone Book tab on the right side of the Web Phone screen to display or hide the phone book feature. The phone book feature allows you to search all entries configured in your personal phone book or system phone book configured on the X6004.
Search	In the left drop down list box select the search criteria. The search criteria consist of the fields you fill in when creating phone book entries. In the right text box type in your search criteria. Click Search to display any phone book entries that match your query.

Table 132 Web Phone

LABEL	DESCRIPTION
Call Duration	This total time of your conversation is displayed above the input field in the web phone GUI.
Input Text	Type or use your keypad to enter the phone number you want to dial. The web phone follows the same dialing rules that you have to follow when you are making calls from any other phone connected to the X6004.
Status	The status of your phone call is displayed below the text input field. The web phone GUI displays the current status of a phone call, that is “Ringing”, “Talking” or “Bye”. It also displays the phone number you dialed from the web phone.
Phone Keypad	<p>You can use your mouse to click on the numbers that make up the telephone number you want to dial.</p> <p>Use the Clear icon () to delete digits from the screen.</p> <p>Use the Dial/Pick up icon () to dial the number.</p> <p>Use the Hang up icon () to end a call or to delete a number in the input field.</p> <p>Use the Transfer icon () to forward a call to another extension.</p>

Interactive Voice Response (IVR) System

This chapter shows you how to use the personal IVR system on the X6004.

33.1 IVR Overview

IVR is a phone technology that allows a computer to detect voice and touch tones using a normal phone. An IVR system can respond with pre-recorded audio prompts to further direct callers on how to proceed. IVR systems can be used to control most functions where the interface can be broken down into a series of simple menu choices.

The X6004 has personal IVR system which allows users to edit some of their personal (unique to each extension) settings. The IVR system on the X6004 allows users to:

- Change their voicemail, IVR, and web phone PIN.
- Configure their call forwarding and blacklist settings.
- Configure their voicemail settings.

33.2 Accessing IVR

Users can access their personal IVR by dialing the feature code for IVR followed by their extension number. The feature code for IVR is configured in the **Configuration > PBX > Server Configuration > SIP Server > Feature Code** screen (see [Section 7.5 on page 100](#)). For example, if the feature code for IVR is an asterisk (*), then a caller with extension **1001** must dial ***1001** to access their personal IVR system.

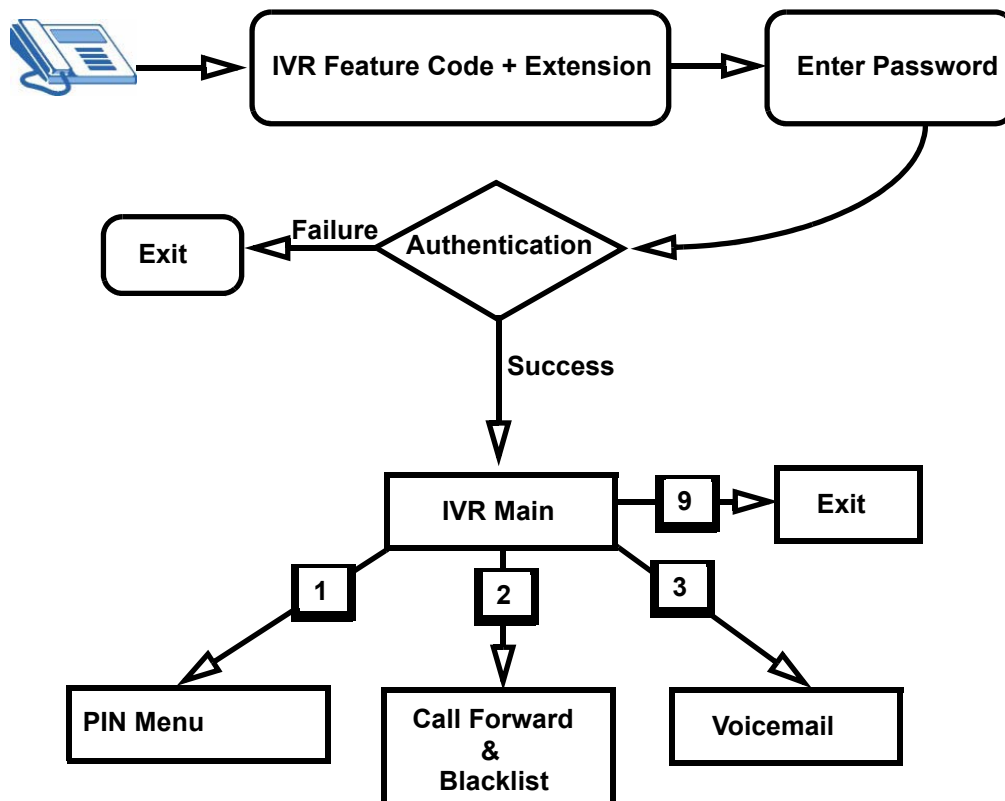
Personal IVR can be accessed as an internal call or users can call from an outside line and dial the feature code for IVR followed by their extension when an auto-attendant prompts them to dial the extension they wish to reach.

Users must authenticate before they can edit their configuration settings via IVR. When users dial into their personal IVR they are prompted to enter their PIN. The IVR PIN is assigned to each extension when the extension is created. See [Section 14.3.3 on page 134](#) for information on how to configure the IVR PIN for SIP extensions and [Section 14.3.11 on page 142](#) for analog phone extensions. If a user authenticates successfully, then he or she is guided through the personal IVR menus via a pre-recorded audio prompts. If a user fails to authenticate, the X6004 plays a message indicating that a wrong password was entered and the call is dropped.

33.3 Personal IVR Main Flow

The following figure describes the main flow in the personal IVR system.

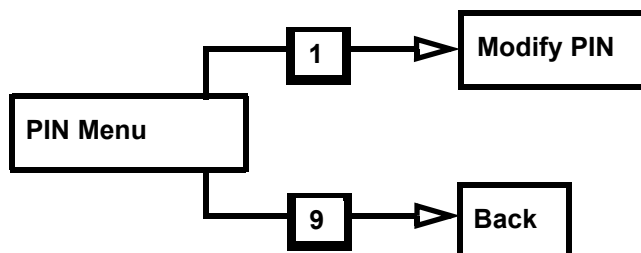
Figure 232 Personal IVR Flow



33.4 Personal IVR PIN Menu

The following figure describes the **PIN Menu**. From **IVR Main**, press number **1** on your phone keypad to enter the **PIN Menu**. This menu allows you to change the PIN used to authenticate with your voicemail system, web phone and personal IVR.

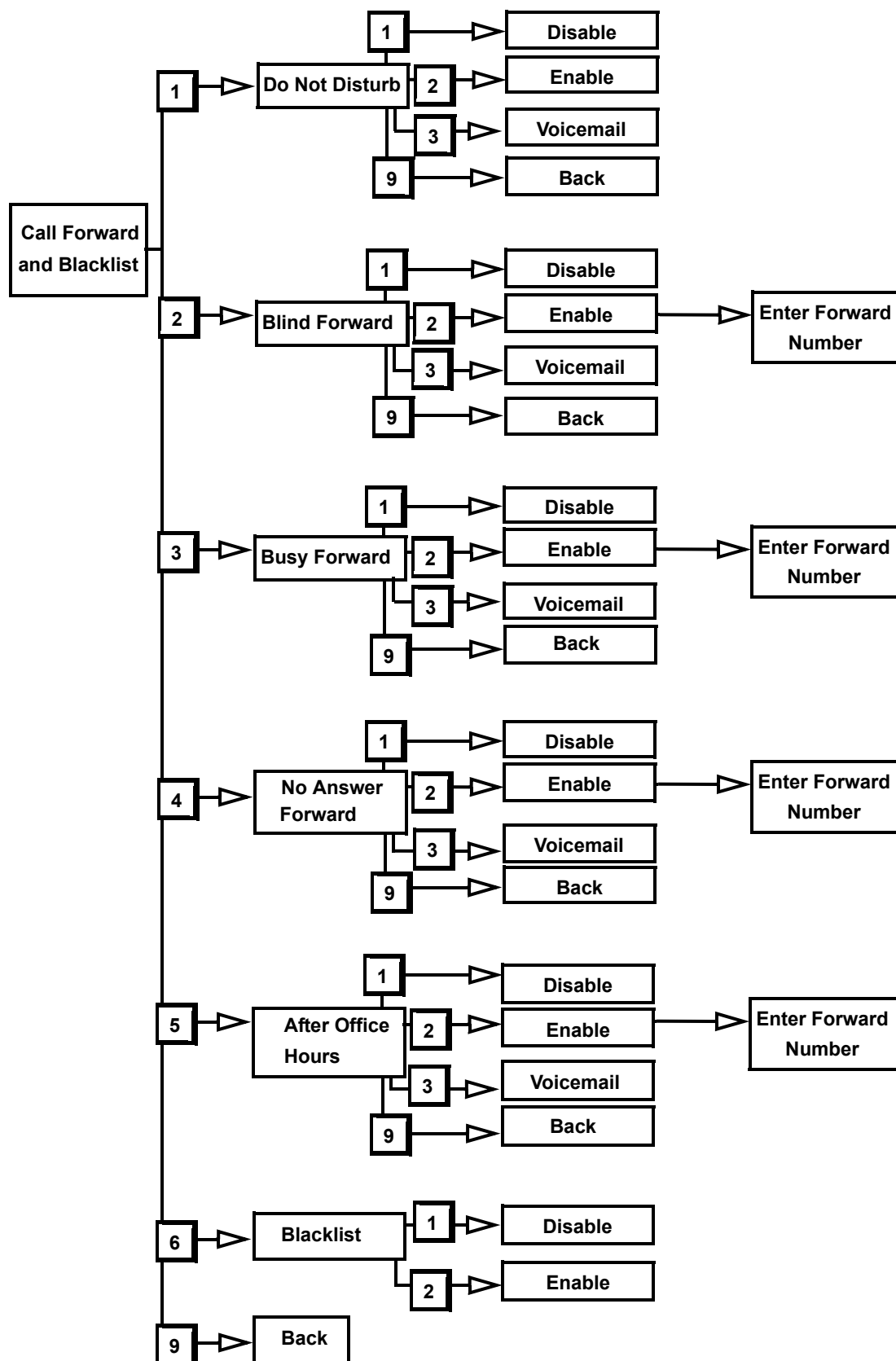
Figure 233 IVR: PIN Menu



33.5 Personal IVR Call Forward & Blacklist

The following figure describes the **Call Forward & Blacklist Menu**. From **IVR Main**, press number **2** on your phone keypad to enter the **Call Forward & Blacklist Menu**. This menu allows you to enable the **Do Not Disturb**, **Blind Forward**, **Busy Forward**, **No Answer Forward**, **After Office Hours** (forward) and **Blacklist** functions. You can also specify the telephone extension you want your calls forwarded to or alternatively you can choose to forward calls to your voicemail.

See [Section 14.3.12 on page 143](#) for more information on call forwarding features and how to configure office hours settings for individual extensions.

Figure 234 IVR: Call Forward & Blacklist

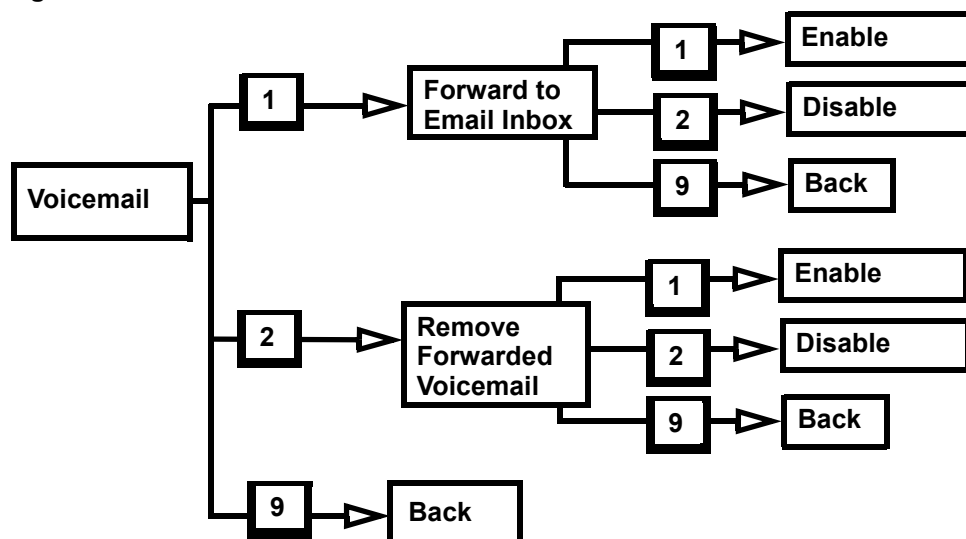
33.6 Personal IVR Voicemail

The following figure describes the **Voicemail Menu**. From **IVR Main**, press number **3** on your phone keypad to enter the **Voicemail Menu**. This menu allows you to enable sending your voicemail as an audio file attachment to your email inbox.

You can also enable erasing your voicemail from the X6004 once it has been forwarded to your email inbox. You should enable this option if you do not want to use the built-in flash memory on the X6004 to store your voicemail messages.

See [Chapter 10 on page 111](#) for more information on the voicemail feature and [Section 7.5 on page 100](#) for information on how to configure the feature code for voicemail (this is the number you have to dial to listen to your voicemail messages via your handset).

Figure 235 IVR: Voicemail



PART VI

Appendices & Index

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[IP Addresses and Subnetting \(287\)](#)
[Open Software Announcements \(297\)](#)
[Legal Information \(317\)](#)
[Customer Support \(321\)](#)
[Index \(327\)](#)

Product Specifications

The following tables summarize the X6004's hardware and firmware features.

Table 133 Hardware Specifications

SPECIFICATION	DESCRIPTION
Dimensions	Standard 19" rack mountable 438 mm (W) x 309 mm (D) x 66 mm (H)
Weight	5.6 Kg
Power Specification	One Backup Power Supply (BPS) connector: 120W 12 V DC) AC: 100 - 240 VAC 50/60Hz 1.5A max internal universal power supply
Interfaces	LAN: 10/100 Base-Tx ports WAN: 10/100 Base-Tx ports Auto-negotiation Auto-MDIX One console port
Expansion Slots	4 expansion slots with support for the following interface cards: <ul style="list-style-type: none"> • 4-port FXO interface card • 4-port FXS interface card • Combination 2-port FXS 2-port FXO interface card with lifeline support (calls can be made to the PSTN in case of a power failure on the X6004)
Hard Drive Support	One hard drive slot for an 80 GB hard drive installation
DSP Module Support	The system comes with a built-in 32 channel DSP channel and has 2 slots for additional DSP modules. Contact your vendor for DSP modules suitable for the X6004.
LEDs	BPS, PWR, SYS, ALM, HDD Per LAN/WAN port: 10, 100 Per FXO/FXS interface card: Sys, Port 1-4
Operating Environment	Temperature: 0° C ~ 40° C (32° F ~ 104° F) Humidity: 10 ~ 90% (non-condensing)
Storage Environment	Temperature: -30° C ~ 60° C (13° F ~ 158° F) Humidity: 20 ~ 90% (non-condensing)
Power Wire Gauge	18AWGX3C
Fuse Specification	250 VAC, T4A

Table 134 Firmware Specifications

FEATURE	DESCRIPTION
Default IP Address / Subnet Mask	LAN: 192.168.1.12 / 255.255.255.0 WAN: 172.16.1.1 / 255.255.255.0
Default Subnet Mask	255.255.255.0 (24 bits)
Administrator User Name	admin
Default Password	1234
Device Management	Use the web configurator or commands to easily configure the rich range of features on the X6004.
SIP Server	The X6004 performs SIP proxy, registrar and redirect server functions.
Auto Provisioning	The X6004 can send auto configuration files to ZyXEL IP phones.
QoS	The X6004 can mark outgoing VoIP frames with DiffServ code point values, ToS priority values or user specified values for the ToS field in the IP header.
Voicemail	The X6004 can store voicemail messages on the flash memory, hard drive (if installed) or it can forward voicemail messages to individual end user email accounts. Maximum voicemail length per message: 90 seconds Maximum total voicemail length per user: 300 seconds
Static Route	Static routes tell the X6004 how to forward VoIP traffic to remote networks.
Extension Management	Manage extensions by placing them in authority groups. You can then assign calling privileges to the authority groups. The X6004 supports SIP client devices as well as traditional analog phones if an FXS interface card has been installed.
Auto-attendant	The X6004 supports up to 3 sets of auto-attendant profiles to handle incoming calls. Auto-attendant helps guide incoming calls to their destination. Audio Format for Auto-Attendant: G.711 format audio file (*.wav), μ -law 8-bit mono mode. Maximum size of a single message: 600 kb. Maximum size of all messages 10 Mb.
Outbound Line Groups	The X6004 supports outbound lines via SIP connections to an ITSP, trusted peer connections. PSTN connections are also supported, if an FXO interface card is installed.
LCR	Least Cost Routing allows administrators to set up dialing rules and configure priorities for outbound lines used when users make phone calls.
Hunt Group	Configure a group of user extensions which can be reached by dialing a single phone number. This can be used for a call center application.
Page Group	Configure sets of extensions that can all be called at the same time by dialing a single number (page group number). When a page group number is dialed, all of the extensions automatically pick up via speakerphone.
Emergency Call	Configure emergency telephone numbers which are given the highest priority for outbound lines on the X6004.
Conference Calling	Configure conference rooms which can be accessed by callers from within your organization as well as from outside your organization.

Table 134 Firmware Specifications

FEATURE	DESCRIPTION
Music on Hold	Specify an audio file to play for callers who are placed on hold. G.711 format audio file (*.wav), μ -law
Distinctive Ring	Specify different rings for calls based on the source of the call.
Auto Callback	The X6004 can automatically call back a busy extension once it frees up.
Call Parking	The X6004 allows you to put a call on hold and pick up the call again from another location within your organization.
ZyStack	Configure up to 5 X6004 to work together under a single management IP address.
Call Detail Record	The X6004 can generate call detail records and send them to a MySQL database and the aged file (compressed file containing CDRs) can be sent to the administrator via email.
Syslog	The X6004 can generate syslog messages and send it to a syslog server.
IVR	Interactive Voice Response system allows users to edit some of their personal (unique to their extension) settings via their handsets. For example, users can change their voicemail and forwarding settings using IVR.
Firmware Upgrade	Download new firmware (when available) from the ZyXEL web site and use the web configurator, CLI or an FTP tool to put it on the X6004. Note: Only upload firmware for your specific model!
Configuration Backup & Restoration	Make a copy of the X6004's configuration and put it back on the X6004 later if you decide you want to revert back to an earlier configuration.

The following list, which is not exhaustive, illustrates the standards supported in the X6004.

Table 135 Standards Supported

STANDARD	DESCRIPTION
RFC 791	IP
RFC 793	TCP
RFC 826	Address Resolution Protocol (ARP)
RFC 867	Daytime Protocol
RFC 868	Time Protocol
RFC 894	Ethernet II Encapsulation
RFC 1305	Network Time Protocol (NTP version 3)
RFC 1889	RTP
RFC 1890	RTCP
RFC 2131, RFC 2132	Dynamic Host Configuration Protocol (DHCP)
RFC 2136	DDNS
RFC 2327	Session Description Protocol (SDP)
RFC 2833	DTMF
RFC 3164	Syslog
RFC 3261	SIP
RFC 3842	Message Waiting Indicator

Table 135 Standards Supported (continued)

STANDARD	DESCRIPTION
Safety	UL 60950-1 CSA 60950-1 EN 60950-1 IEC 60950-1
EMC	FCC Part 15 (Class A) CE EMC (Class A)

IP Addresses and Subnetting

This appendix introduces IP addresses and subnet masks.

IP addresses identify individual devices on a network. Every networking device (including computers, servers, routers, printers, etc.) needs an IP address to communicate across the network. These networking devices are also known as hosts.

Subnet masks determine the maximum number of possible hosts on a network. You can also use subnet masks to divide one network into multiple sub-networks.

Introduction to IP Addresses

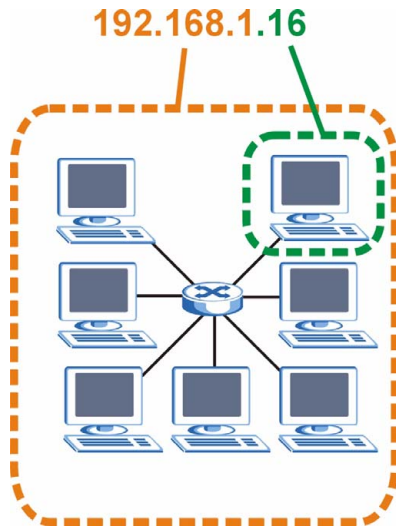
One part of the IP address is the network number, and the other part is the host ID. In the same way that houses on a street share a common street name, the hosts on a network share a common network number. Similarly, as each house has its own house number, each host on the network has its own unique identifying number - the host ID. Routers use the network number to send packets to the correct network, while the host ID determines to which host on the network the packets are delivered.

Structure

An IP address is made up of four parts, written in dotted decimal notation (for example, 192.168.1.1). Each of these four parts is known as an octet. An octet is an eight-digit binary number (for example 11000000, which is 192 in decimal notation).

Therefore, each octet has a possible range of 00000000 to 11111111 in binary, or 0 to 255 in decimal.

The following figure shows an example IP address in which the first three octets (192.168.1) are the network number, and the fourth octet (16) is the host ID.

Figure 236 Network Number and Host ID

How much of the IP address is the network number and how much is the host ID varies according to the subnet mask.

Subnet Masks

A subnet mask is used to determine which bits are part of the network number, and which bits are part of the host ID (using a logical AND operation). The term “subnet” is short for “sub-network”.

A subnet mask has 32 bits. If a bit in the subnet mask is a “1” then the corresponding bit in the IP address is part of the network number. If a bit in the subnet mask is “0” then the corresponding bit in the IP address is part of the host ID.

The following example shows a subnet mask identifying the network number (in bold text) and host ID of an IP address (192.168.1.2 in decimal).

Table 136 IP Address Network Number and Host ID Example

	1ST OCTET: (192)	2ND OCTET: (168)	3RD OCTET: (1)	4TH OCTET (2)
IP Address (Binary)	11000000	10101000	00000001	00000010
Subnet Mask (Binary)	11111111	11111111	11111111	00000000
Network Number	11000000	10101000	00000001	
Host ID				00000010

By convention, subnet masks always consist of a continuous sequence of ones beginning from the leftmost bit of the mask, followed by a continuous sequence of zeros, for a total number of 32 bits.

Subnet masks can be referred to by the size of the network number part (the bits with a “1” value). For example, an “8-bit mask” means that the first 8 bits of the mask are ones and the remaining 24 bits are zeroes.

Subnet masks are expressed in dotted decimal notation just like IP addresses. The following examples show the binary and decimal notation for 8-bit, 16-bit, 24-bit and 29-bit subnet masks.

Table 137 Subnet Masks

	BINARY				DECIMAL
	1ST OCTET	2ND OCTET	3RD OCTET	4TH OCTET	
8-bit mask	11111111	00000000	00000000	00000000	255.0.0.0
16-bit mask	11111111	11111111	00000000	00000000	255.255.0.0
24-bit mask	11111111	11111111	11111111	00000000	255.255.255.0
29-bit mask	11111111	11111111	11111111	11111000	255.255.255.248

Network Size

The size of the network number determines the maximum number of possible hosts you can have on your network. The larger the number of network number bits, the smaller the number of remaining host ID bits.

An IP address with host IDs of all zeros is the IP address of the network (192.168.1.0 with a 24-bit subnet mask, for example). An IP address with host IDs of all ones is the broadcast address for that network (192.168.1.255 with a 24-bit subnet mask, for example).

As these two IP addresses cannot be used for individual hosts, calculate the maximum number of possible hosts in a network as follows:

Table 138 Maximum Host Numbers

SUBNET MASK		HOST ID SIZE		MAXIMUM NUMBER OF HOSTS
8 bits	255.0.0.0	24 bits	$2^{24} - 2$	16777214
16 bits	255.255.0.0	16 bits	$2^{16} - 2$	65534
24 bits	255.255.255.0	8 bits	$2^8 - 2$	254
29 bits	255.255.255.248	3 bits	$2^3 - 2$	6

Notation

Since the mask is always a continuous number of ones beginning from the left, followed by a continuous number of zeros for the remainder of the 32 bit mask, you can simply specify the number of ones instead of writing the value of each octet. This is usually specified by writing a “/” followed by the number of bits in the mask after the address.

For example, 192.1.1.0 /25 is equivalent to saying 192.1.1.0 with subnet mask 255.255.255.128.

The following table shows some possible subnet masks using both notations.

Table 139 Alternative Subnet Mask Notation

SUBNET MASK	ALTERNATIVE NOTATION	LAST OCTET (BINARY)	LAST OCTET (DECIMAL)
255.255.255.0	/24	0000 0000	0
255.255.255.128	/25	1000 0000	128

Table 139 Alternative Subnet Mask Notation (continued)

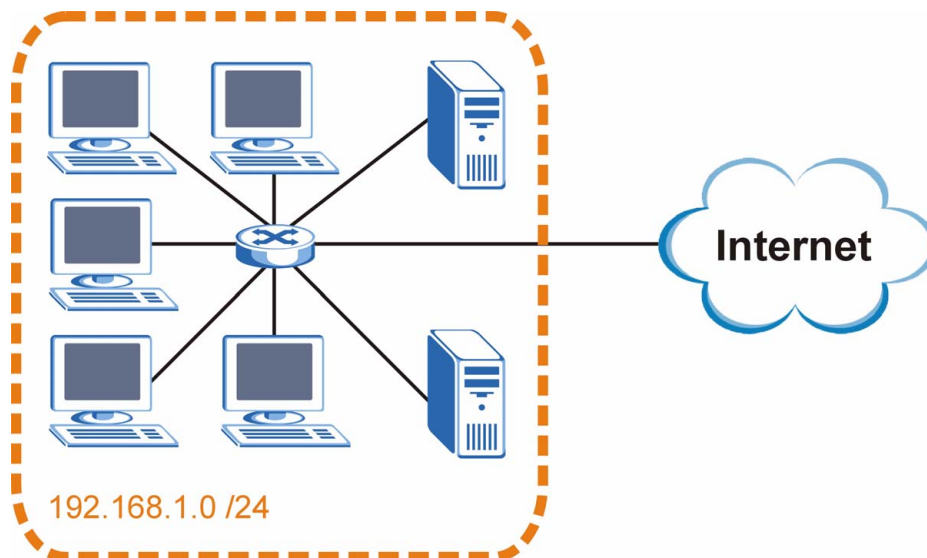
SUBNET MASK	ALTERNATIVE NOTATION	LAST OCTET (BINARY)	LAST OCTET (DECIMAL)
255.255.255.192	/26	1100 0000	192
255.255.255.224	/27	1110 0000	224
255.255.255.240	/28	1111 0000	240
255.255.255.248	/29	1111 1000	248
255.255.255.252	/30	1111 1100	252

Subnetting

You can use subnetting to divide one network into multiple sub-networks. In the following example a network administrator creates two sub-networks to isolate a group of servers from the rest of the company network for security reasons.

In this example, the company network address is 192.168.1.0. The first three octets of the address (192.168.1) are the network number, and the remaining octet is the host ID, allowing a maximum of $2^8 - 2$ or 254 possible hosts.

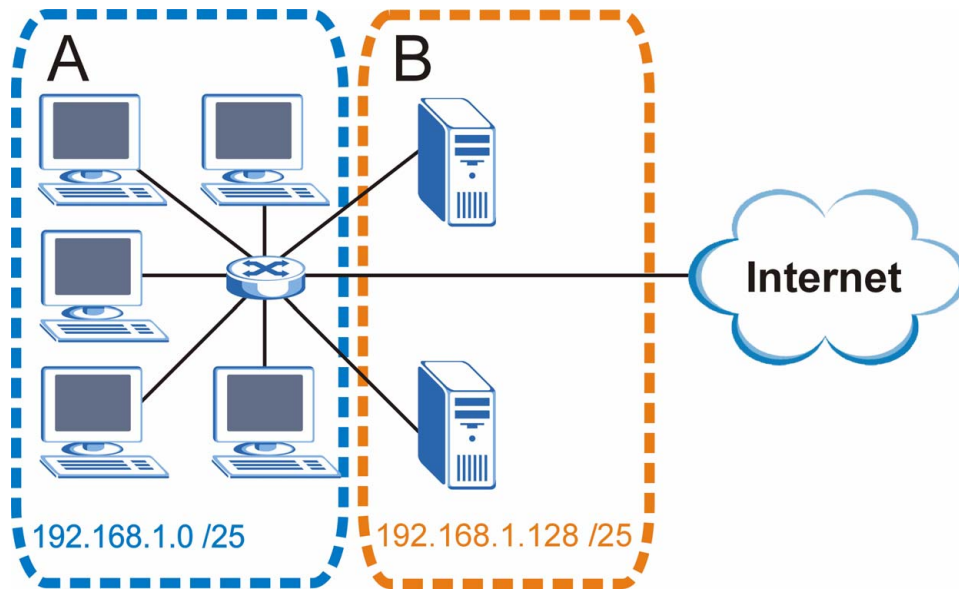
The following figure shows the company network before subnetting.

Figure 237 Subnetting Example: Before Subnetting

You can “borrow” one of the host ID bits to divide the network 192.168.1.0 into two separate sub-networks. The subnet mask is now 25 bits (255.255.255.128 or /25).

The “borrowed” host ID bit can have a value of either 0 or 1, allowing two subnets; 192.168.1.0 /25 and 192.168.1.128 /25.

The following figure shows the company network after subnetting. There are now two sub-networks, **A** and **B**.

Figure 238 Subnetting Example: After Subnetting

In a 25-bit subnet the host ID has 7 bits, so each sub-network has a maximum of $2^7 - 2$ or 126 possible hosts (a host ID of all zeroes is the subnet's address itself, all ones is the subnet's broadcast address).

192.168.1.0 with mask 255.255.255.128 is subnet **A** itself, and 192.168.1.127 with mask 255.255.255.128 is its broadcast address. Therefore, the lowest IP address that can be assigned to an actual host for subnet **A** is 192.168.1.1 and the highest is 192.168.1.126.

Similarly, the host ID range for subnet **B** is 192.168.1.129 to 192.168.1.254.

Example: Four Subnets

The previous example illustrated using a 25-bit subnet mask to divide a 24-bit address into two subnets. Similarly, to divide a 24-bit address into four subnets, you need to “borrow” two host ID bits to give four possible combinations (00, 01, 10 and 11). The subnet mask is 26 bits (11111111.11111111.11111111.11000000) or 255.255.255.192.

Each subnet contains 6 host ID bits, giving $2^6 - 2$ or 62 hosts for each subnet (a host ID of all zeroes is the subnet itself, all ones is the subnet's broadcast address).

Table 140 Subnet 1

IP/SUBNET MASK	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address (Decimal)	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	00000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.63	Highest Host ID: 192.168.1.62	

Table 141 Subnet 2

IP/SUBNET MASK	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	64
IP Address (Binary)	11000000.10101000.00000001.	01000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.64	Lowest Host ID: 192.168.1.65	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

Table 142 Subnet 3

IP/SUBNET MASK	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	10000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.191	Highest Host ID: 192.168.1.190	

Table 143 Subnet 4

IP/SUBNET MASK	NETWORK NUMBER	LAST OCTET BIT VALUE
IP Address	192.168.1.	192
IP Address (Binary)	11000000.10101000.00000001.	11000000
Subnet Mask (Binary)	11111111.11111111.11111111.	11000000
Subnet Address: 192.168.1.192	Lowest Host ID: 192.168.1.193	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

Example: Eight Subnets

Similarly, use a 27-bit mask to create eight subnets (000, 001, 010, 011, 100, 101, 110 and 111).

The following table shows IP address last octet values for each subnet.

Table 144 Eight Subnets

SUBNET	SUBNET ADDRESS	FIRST ADDRESS	LAST ADDRESS	BROADCAST ADDRESS
1	0	1	30	31
2	32	33	62	63
3	64	65	94	95
4	96	97	126	127

Table 144 Eight Subnets (continued)

SUBNET	SUBNET ADDRESS	FIRST ADDRESS	LAST ADDRESS	BROADCAST ADDRESS
5	128	129	158	159
6	160	161	190	191
7	192	193	222	223
8	224	225	254	255

Subnet Planning

The following table is a summary for subnet planning on a network with a 24-bit network number.

Table 145 24-bit Network Number Subnet Planning

NO. "BORROWED" HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
1	255.255.255.128 (/25)	2	126
2	255.255.255.192 (/26)	4	62
3	255.255.255.224 (/27)	8	30
4	255.255.255.240 (/28)	16	14
5	255.255.255.248 (/29)	32	6
6	255.255.255.252 (/30)	64	2
7	255.255.255.254 (/31)	128	1

The following table is a summary for subnet planning on a network with a 16-bit network number.

Table 146 16-bit Network Number Subnet Planning

NO. "BORROWED" HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
1	255.255.128.0 (/17)	2	32766
2	255.255.192.0 (/18)	4	16382
3	255.255.224.0 (/19)	8	8190
4	255.255.240.0 (/20)	16	4094
5	255.255.248.0 (/21)	32	2046
6	255.255.252.0 (/22)	64	1022
7	255.255.254.0 (/23)	128	510
8	255.255.255.0 (/24)	256	254
9	255.255.255.128 (/25)	512	126
10	255.255.255.192 (/26)	1024	62
11	255.255.255.224 (/27)	2048	30
12	255.255.255.240 (/28)	4096	14
13	255.255.255.248 (/29)	8192	6

Table 146 16-bit Network Number Subnet Planning (continued)

NO. "BORROWED" HOST BITS	SUBNET MASK	NO. SUBNETS	NO. HOSTS PER SUBNET
14	255.255.255.252 (/30)	16384	2
15	255.255.255.254 (/31)	32768	1

Configuring IP Addresses

Where you obtain your network number depends on your particular situation. If the ISP or your network administrator assigns you a block of registered IP addresses, follow their instructions in selecting the IP addresses and the subnet mask.

If the ISP did not explicitly give you an IP network number, then most likely you have a single user account and the ISP will assign you a dynamic IP address when the connection is established. If this is the case, it is recommended that you select a network number from 192.168.0.0 to 192.168.255.0. The Internet Assigned Number Authority (IANA) reserved this block of addresses specifically for private use; please do not use any other number unless you are told otherwise. You must also enable Network Address Translation (NAT) on the X6004.

Once you have decided on the network number, pick an IP address for your X6004 that is easy to remember (for instance, 192.168.1.1) but make sure that no other device on your network is using that IP address.

The subnet mask specifies the network number portion of an IP address. Your X6004 will compute the subnet mask automatically based on the IP address that you entered. You don't need to change the subnet mask computed by the X6004 unless you are instructed to do otherwise.

Private IP Addresses

Every machine on the Internet must have a unique address. If your networks are isolated from the Internet (running only between two branch offices, for example) you can assign any IP addresses to the hosts without problems. However, the Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of IP addresses specifically for private networks:

- 10.0.0.0 — 10.255.255.255
- 172.16.0.0 — 172.31.255.255
- 192.168.0.0 — 192.168.255.255

You can obtain your IP address from the IANA, from an ISP, or it can be assigned from a private network. If you belong to a small organization and your Internet access is through an ISP, the ISP can provide you with the Internet addresses for your local networks. On the other hand, if you are part of a much larger organization, you should consult your network administrator for the appropriate IP addresses.

Regardless of your particular situation, do not create an arbitrary IP address; always follow the guidelines above. For more information on address assignment, please refer to RFC 1597, Address Allocation for Private Internets and RFC 1466, Guidelines for Management of IP Address Space.

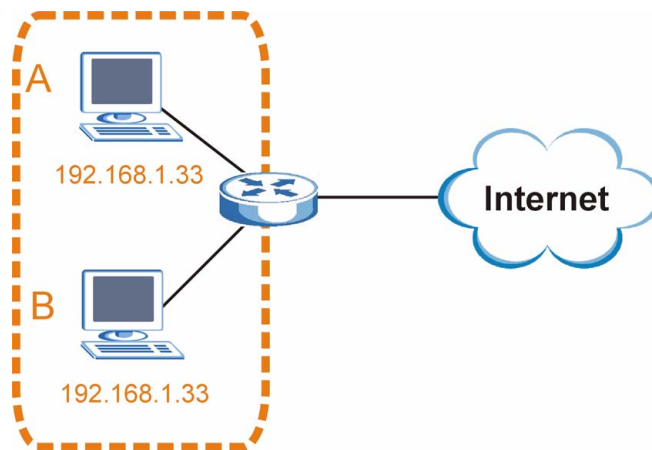
IP Address Conflicts

Each device on a network must have a unique IP address. Devices with duplicate IP addresses on the same network will not be able to access the Internet or other resources. The devices may also be unreachable through the network.

Conflicting Computer IP Addresses Example

More than one device can not use the same IP address. In the following example computer **A** has a static (or fixed) IP address that is the same as the IP address that a DHCP server assigns to computer **B** which is a DHCP client. Neither can access the Internet. This problem can be solved by assigning a different static IP address to computer **A** or setting computer **A** to obtain an IP address automatically.

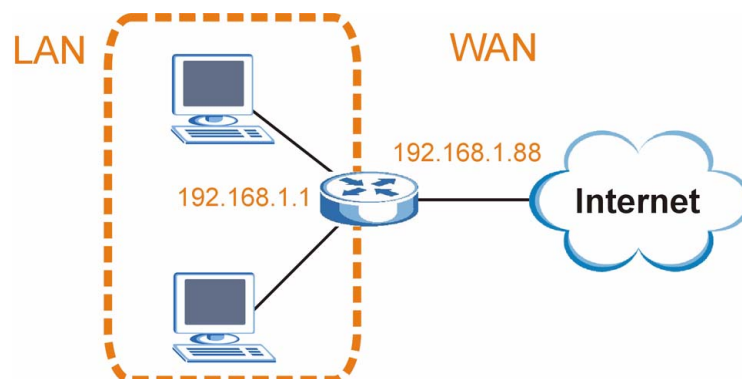
Figure 239 Conflicting Computer IP Addresses Example



Conflicting Router IP Addresses Example

Since a router connects different networks, it must have interfaces using different network numbers. For example, if a router is set between a LAN and the Internet (WAN), the router's LAN and WAN addresses must be on different subnets. In the following example, the LAN and WAN are on the same subnet. The LAN computers cannot access the Internet because the router cannot route between networks.

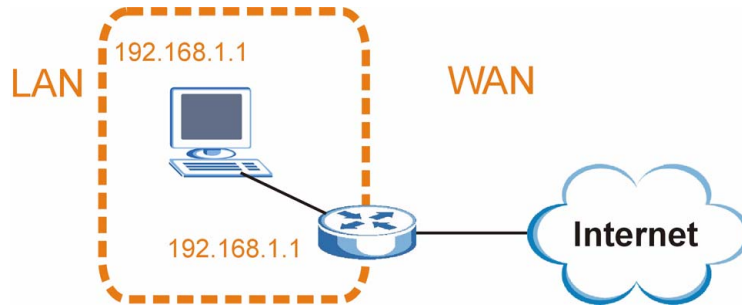
Figure 240 Conflicting Computer IP Addresses Example



Conflicting Computer and Router IP Addresses Example

More than one device can not use the same IP address. In the following example, the computer and the router's LAN port both use 192.168.1.1 as the IP address. The computer cannot access the Internet. This problem can be solved by assigning a different IP address to the computer or the router's LAN port.

Figure 241 Conflicting Computer and Router IP Addresses Example



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